SACE Stage 1 **Psychology Workbook**

Innika Ackerley
Deb Green
Tam Hood
Lauren Scarfe

Essentials education

ADELAIDE TUITION CENTRE

PUBLISHING INFORMATION
This Workbook is part of the Essentials series, designed to support the teaching of SACE Stage 1 and 2 subjects in South Australia. It is specially designed to meet the requirements of SACE Stage 1 Psychology.

The Essentials Education series is published by
Adelaide Tuition Centre
PO Box 997, North Adelaide, S.A. 5006.
TELEPHONE (08) 8180 0695
www.essentialseducation.com.au

LIBRARY CATALOGUE:
Ackerley; Innika – Green; Deb – Hood; Tam – Scarfe; Lauren
1. Psychology - 2.Essentials Workbook
ISBN - 978-1-925505-54-2
First Edition 2024.
Copyright © Essentials Education 2024.

COPYRIGHT INFORMATION
The copyright of the text of this book remains the property of the authors and the copyright of the diagrams and cartoons belongs to the publisher. All rights are reserved except under the conditions described in the Copyright Act 1968 of Australia and subsequent amendments. No part of this publication may be reproduced, stored in a retrieval system, or transmitted in any form or by any means, without the prior permission of the publisher. While every care has been taken to trace and acknowledge copyright, the publishers' tender apologies for any accidental infringement where copyright has proved traceable.

TABLE OF CONTENTS

8 **TOPIC 1: COGNITIVE PSYCHOLOGY**
9 1.1 Memory
12 1.2 Modal model of memory
19 1.3 Levels of processing
21 1.4 Displacement theory of forgetting
22 1.5 Other theories of forgetting
24 1.6 Biological causes of forgetting
27 1.7 Cultural influences on memory
29 1.8 Enhancing memory
34 1.9 Social influences on memory
36 1.10 Improving reconstructive memory

38 **TOPIC 2: NEUROPSYCHOLOGY**
39 2.1 The nervous system
56 2.2 Neurons
61 2.3 The brain
77 2.4 Neurotransmitters
83 2.5 The biological basis of mental illness
87 2.6 Ethical considerations of neuropsychological research

94 **TOPIC 3: LIFESPAN PSYCHOLOGY**
95 3.1 What is lifespan psychology?
102 3.2 Theories of development
121 3.3 Methods of investigation
127 3.4 Cultural considerations
131 3.5 Technology, social media and development

140 **TOPIC 4: EMOTION**
141 4.1 The components of emotion
154 4.2 Biological and cultural factors of emotion
164 4.3 Emotions in everyday experiences
170 4.4 Emotional disorders
184 4.5 Studying emotion

194 **TOPIC 5: WELLBEING**
195 5.1 Mental health and mental illness
199 5.2 The Biopsychosocial explanation of mental illness
208 5.3 Human flourishing
213 5.4 Character strengths and virtues vs the DSM-5
223 5.5 Interventions in positive psychology focus on increasing wellbeing

234 **SCIENCE INQUIRY SKILLS**
235 SIS 1 Biopsychosocial approach
241 SIS 2 Scientific method
250 SIS 3 Investigation designs
263 SIS 4 Data collection and presentation
274 SIS 5 Using statistics to analyse trends, patterns and correlations
276 SIS 6 Critical evaluation of procedures and data
284 SIS 7 Drawing conclusions and making generalisations
294 SIS 8 Ethical practice

310 **SCIENCE AS A HUMAN ENDEAVOUR**

320 **ANSWERS**

335 **GLOSSARY**

ABOUT THE AUTHORS

INNIKA ACKERLEY (BSC (PHYSIOLOGY & PSYCHOLOGY), GRAD DIP. ED. (SCIENCE 7-12)

Innika Ackerley holds the role of Science Learning Leader and senior Psychology teacher at Endeavour College in Mawson Lakes, where she has worked for the past 19 years. Innika introduced Psychology to the school in 2009 and has worked tirelessly to develop the subject by creating resources, writing curriculum and developing assessment tasks. Throughout her extensive experience, Innika has been unwavering in her commitment to nurturing an enthusiasm for learning among her students, employing an approach that emphasizes collaboration and inclusivity. While she particularly enjoys teaching Criminal Psychology and Neuropsychology, her primary focus remains on presenting the curriculum with utmost clarity and coherence, empowering students to realize their full potential. Innika extends her heartfelt appreciation to her colleagues, friends and family, who have been there to support her throughout the process of writing this book, with a special expression of gratitude for her wonderful mother, Carol Thompson, and her partner, Ken.

DEB GREEN (MA PSYCHOLOGY, PGDIP.ED.)

Deb Green is currently a School Counsellor and Wellbeing practitioner at Pembroke school in Adelaide. Deb graduated from the University of Aberdeen in 2005 with a Master of Psychology and has accreditation as a Mental Health First Aid Trainer and a Clinical Supervisor with ACA. Deb started her career as a teacher after graduating from the University of Portsmouth with a Post Graduate Diploma of Education.

Due to an interest in the Psychology behind decision making involved in criminal behaviour and psychopathology, Deb completed a Diploma in Forensics and Criminal Profiling which helps to add depth to her teaching of Psychology in related topics. Teaching experience includes A level, GCSE and IB Psychology alongside several years of teaching Sociology and Criminal at a college in Southeast England where she was Head of Psychology prior to emigrating to Australia in 2014. Deb has held various roles throughout her career including director of counselling in private practice and in her local GP practice. Deb worked for Alzheimer's Australia when she arrived in South Australia delivering training in Dementia care to hospitals and care facilities both locally and nationally, a project very close to her heart.

Deb has a passion for supporting young people and teachers to achieve their best and has enhanced her skills by engaging with marking, moderation, and curriculum development in several areas of expertise. Over the last 10 years, Deb has been involved in developing and delivering professional development for teachers and other school counsellors and is currently the President of ACAPS (Australian counsellors and psychologists in schools). Deb is currently studying for the Master of Education (Research) at the University of Adelaide where she aims to pursue a PHd, while continuing her leisurely pursuit of training as a silversmith.

Thanks again to Hannah Martin-Skerm and Sam Barry at the Adelaide Tuition Centre for the opportunity and continued their support to write this resource for the Psychology community.

To the team, Innika Ackerley, Tam Hood and Lauren Scarfe for your hard work and enduring resilience throughout this project. You made it very easy to complete this project with your professionalism and knowledge.

To my family, thank you for your on-going support and belief in all that I do.

TAM HOOD (MA PROFESSIONAL PSYCHOLOGY, PGDIP. PSYCH, B. ED., BA)

Tam Hood is a teacher and provisionally registered Psychologist who at the time of writing this book is completing her internship year to become a generally registered Psychologist. Previously she has worked in suburban, country, and international schools as a Student Counsellor, Wellbeing Leader and teacher of Psychology, Drama and English.

Tam graduated from a Bachelor of Arts in Psychology and Drama from the University of South Australia in 2001, at which point she decided to go overseas to live, work and study for her Bachelor of Education.

Upon returning to Australia and winning the role of Student Counsellor, her passion for the area of Psychology and working with young people was reignited. Thus began her journey towards registration, which included a number of additional tertiary qualifications, and culminating in the completion of her 5th year, Masters of Professional Psychology in 2021.

Tam has been the secretary of the Australian Psychologists and Counsellors in Schools Association (APACS) for the last 6 years and has previously been nominated for an Excellence in Teaching award. She has been involved in Psychology marking and moderation previously.

Tam hopes to use her new skill set to continue to support young people to achieve.

I would like to acknowledge the unending support of my wonderful husband Matt and children Lil and Eddie. Without them, I couldn't have done this.

I would also like to acknowledge the support of my mum, Sandy Evans, who gave her time to edit, and listen to ideas throughout the process. To Jac, Candice and Rikki, all of whom gave their opinions and suggestions to make it better.

And to my fellow authors – thank you for your support to get this amazing book completed.

LAUREN SCARFE (B.SC, B.ED)

Lauren Scarfe holds a Bachelor of Science from Adelaide University as well as a Bachelor of Education (Middle and Secondary) completed at the University of South Australia. She has taught psychology since 2009 and is passionate about redeveloping the curriculum and resources to keep it up to date and relevant to students. She has taught at The Heights School, Seaford Secondary College and Adelaide Botanic High School where she developed the psychology curriculum from years 10 to 12 and has mentored other teachers within the subject. She also spent a year on a teaching exchange to the UK where she acted as Head of Psychology. Another passion is adapting to new technologies and using these in her teaching. To this end she is currently a Lumination Lab Champion at Adelaide Botanic High School supporting other teachers to use virtual reality in their teaching and enjoys directing the school musicals. She has worked for the SACE board in developing a psychology exam and has presented workshops for SASTA at the Psychology Summer Conference. Lauren was also part of the STEM team who received an excellence award at the Australian Education Awards in 2021.

I would like to acknowledge the input of fellow psychology teachers Alana Goldschmidt and Tania Zebian as well as the mentorship of Kirsty Gebert , without whose support and encouragement I would not have attempted this project. I would also like to thank my family and friends for their support during the writing process as well as those on the writing team who have given much appreciated time and wisdom.

The authors wish to acknowledge the Aboriginal and Torres Strait Islander peoples of this nation. We acknowledge the traditional owners of the country throughout Australia and their continuing connection to the land, culture and com¬munity. We acknowledge the traditional custodians of the lands on which we live, learn, and teach, and where this book was written. We acknowledge the cultural diversity of all Aboriginal and Torres Strait Islander peoples and pay respect to Elders past, present and emerging. We celebrate the continuous living cultures of First Australians and acknowledge the important contributions Aboriginal and Torres Strait Islander people have and continue to make in education.

PREFACE

This workbook has been written for students and educators undertaking Stage 1 Psychology in 2024. There are five core topics as prescribed by the Science Understandings in the new SACE Subject Outline. Each topic also includes a full description of the content the authors have interpreted from the SACE subject outline, real world application activities, case studies, informative and coloured diagrams and questions aimed at checking for understanding. Key terms have been highlighted in bold and included as a glossary in the back of this book. Topic 6: Psychology in Context will be also included as part of the digital copy of this book on the Essentials digital platform.

SCIENCE INQUIRY SKILLS

Science Inquiry Skills have been considered throughout each topic and provide opportunities for students to apply their SIS knowledge and understanding in context, analyse data and formulate conclusions. All Science Inquiry Skills questions throughout the workbook are identifiable with the brain symbol. Building on the SIS skills, sample Deconstruct and Design tasks have been provided for teacher consideration. These may be adopted, adapted or reconstructed to suit student contexts.

Science Inquiry Skills are embedded throughout the five topics of the Stage 1 course and can be taught as a standalone topic using the SIS chapter which can be found at the end of the workbook.

SCIENCE AS A HUMAN ENDEAVOUR

Science as a Human Endeavour (SHE) concepts and activities are provided throughout the workbook. These activities can be used as a strategy to get students familiar with identifying the key elements of science: communication and collaboration between scientists, governments and other agencies, the development of new technologies and theories, the influence of other areas and considerations, and the application in psychology. As there is a performance standard related to science in society students and teachers are encouraged to seek out and practice SHE related question to be able to meet the Performance standard and demonstrate they are able to critically explore and understand in depth the interaction between science and society.

CHECKING FOR UNDERSTANDING

Checking for understanding questions in the workbook allow students to build their confidence in addressing and applying their knowledge and understanding to a range of questions that target the SACE Performance Standards. Questions ask students to recall, apply and describe their knowledge of the concepts addressed in the topic to both real world and hypothetical examples.

HELPFUL ONLINE RESOURCES

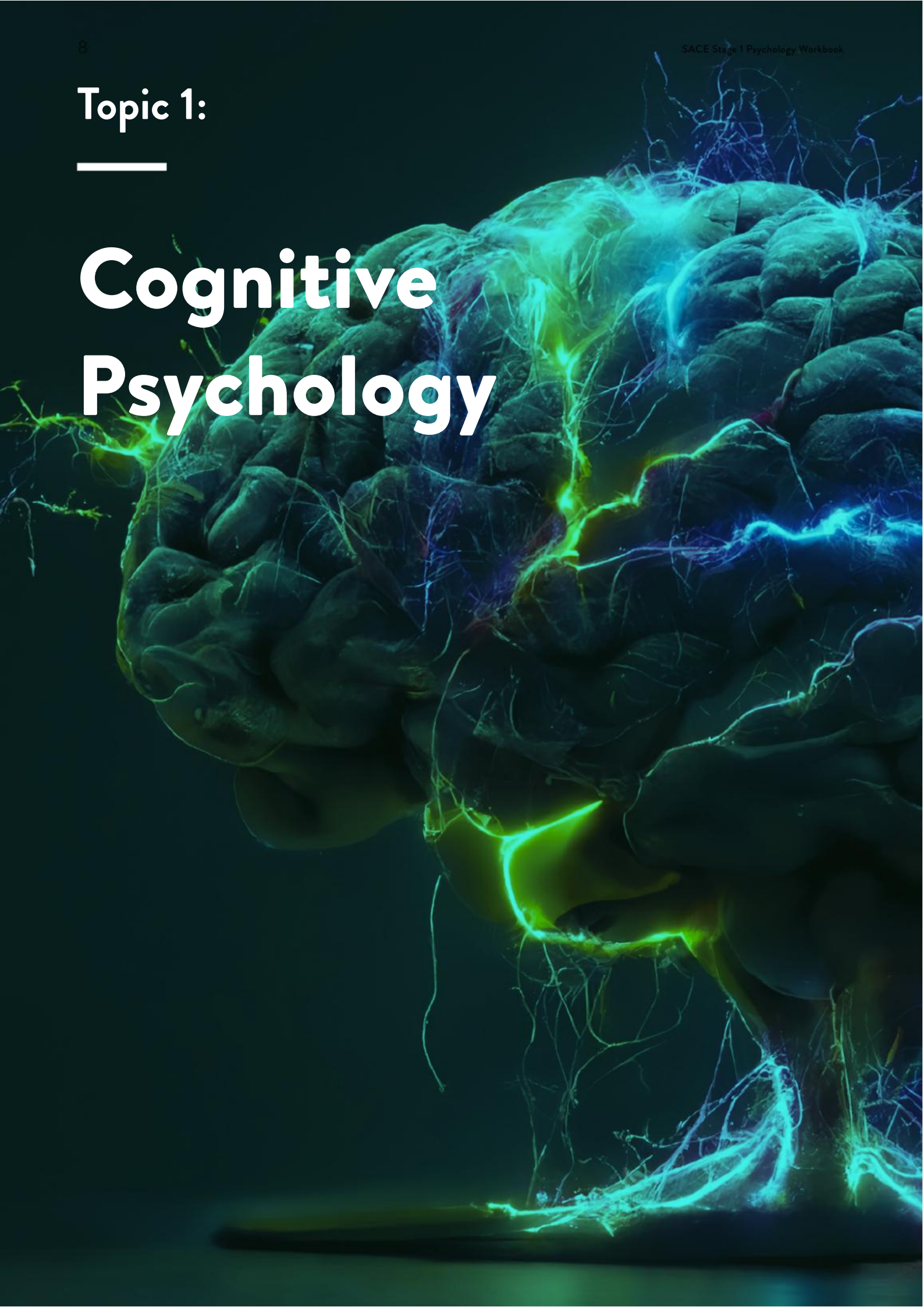
Within each topic 'Helpful online resources' can be found and accessed using a QR code, or clicking the link in the digital version of the book. Online resources include links to You Tube clips, readings, articles and interactive activities aimed at providing further depth into each topic.

WEBSITE LINKS DISCLAIMER Although all of the websites recommended in the workbook were relevant and operational at the time of publication, the authors and the publisher cannot accept any responsibility for any changes that many have occurred to these websites since. Likewise, we are unable to accept responsibility for any malicious software these websites may include and whether particular applications included will operate properly on various platforms.

We hope that you find this resource helpful, and that it demonstrates the interconnection between all the different facets of Psychology and how they relate to our own lives. The authors and publisher wish you all the best for your studies in Stage 1 Psychology.

Topic 1:

Cognitive Psychology



1.1 MEMORY

Memory is the ability to take in information, store it, and recall it later.

Learning Objectives:

- Discuss how memory is different from learning.
- Explain the importance of encoding, storing, and retrieving in memory formation.

2023 Subject Outline | Stage 1

Memory is the overarching term referring to the process of taking in sensory information from all senses, processing this information in a way that makes sense to the individual, storing it in neural pathways and then being able to retrieve the information at a later time. **The information processing model** takes a simplistic approach to this process, treating it as similar to how a computer works.

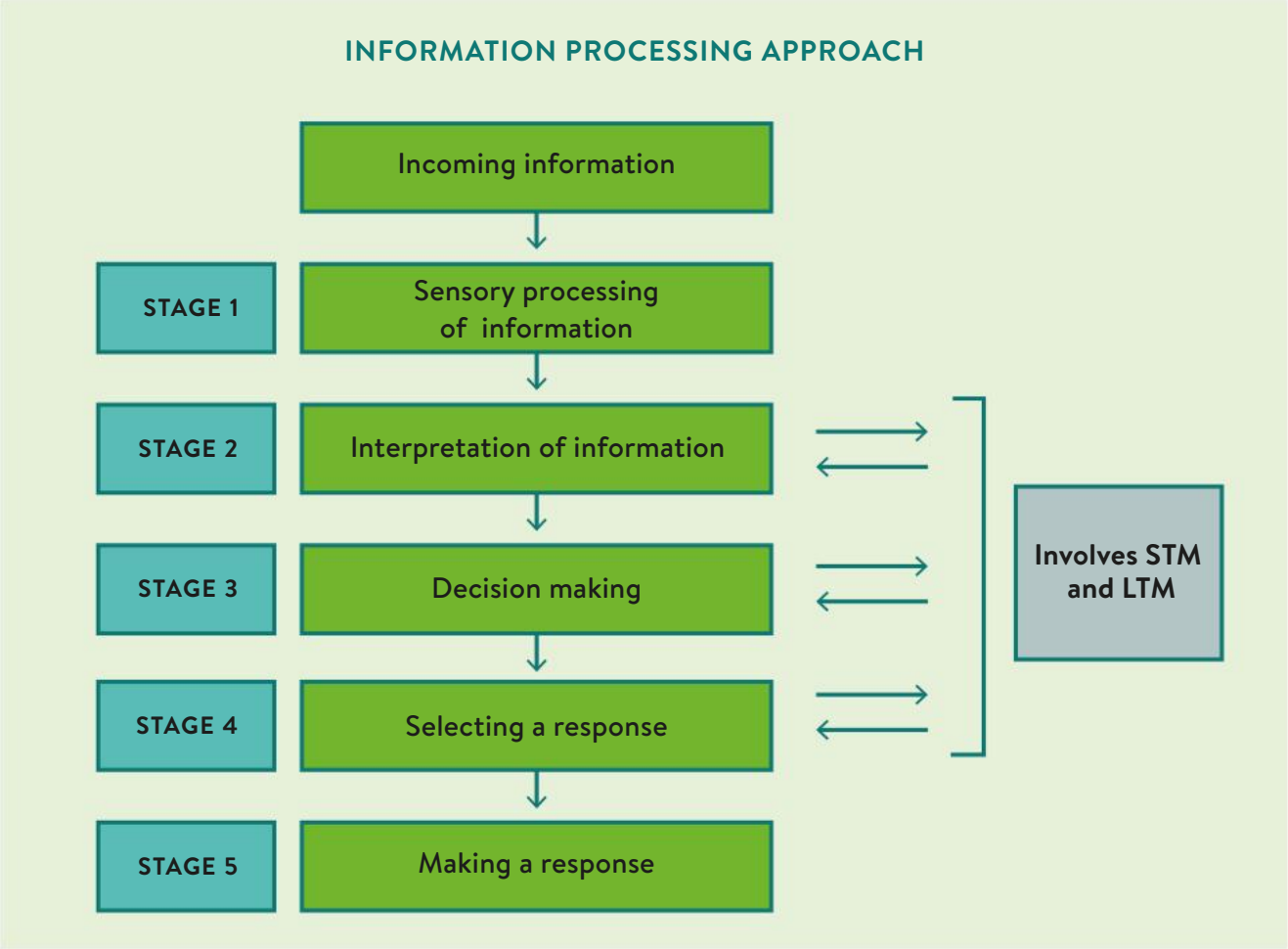


Figure 1.1.1: Stages of the Information Processing Approach to memory adapted from Wickens, 1992.

The stages of the information processing approach deal with incoming information from all of the body's senses. This information enters the relevant processing centres of the brain and are then interpreted using our previous knowledge and contextual cues. Once this has occurred, we make a decision about the information and select a response. An example of this process might be hearing a door slam. The sound is processed in the auditory cortex of the brain and we recognise it as being a door as opposed to other objects in our surroundings. The interpretation of the situation will rely on our knowledge of how the door might have slammed. If there is a person close by we might interpret them as having slammed the door and will consider what their emotional state may be at this time. This will then inform our decision about whether this was purposeful or not. If we think it was, our response might then be to check in with the person.

However, this representation is very simplistic as it doesn't take into consideration the tendency for humans to take in lots of sensory information at once or any emotional or motivational factors such as paying attention. Humans also have the ability to make unusual associations between concepts to form new ideas.

CHECKING FOR UNDERSTANDING

Create a flow chart using the information processing model for the following situation.

INCOMING SENSORY INFORMATION	HEARING A BEE APPROACH YOUR FACE
Processing of sensory information	
↓	↓
Interpretation of Information	
↓	↓
Decision making	
↓	↓
Selecting a response	
↓	↓
Making a response	

In psychology, we often think of the brain as a computer in the way that information is processed. We can use this to compare the processes. While this analogy is useful, it is important to remember that the brain is a complex biological system that cannot be fully understood by such a comparison. Nonetheless, this analogy can help us to better understand the processes involved in learning and memory. Figure 1.1.2 compares the encoding, storage and retrieval processes in a computer with those of human memory.

Each of these processes; **encoding**, **storage** and **retrieval**, are important in memory formation as if there are problems at either stage, memories will not be formed or may not be remembered correctly. If information is encoded incorrectly, that information may be incomplete. For example, if you are not paying attention when a car drives past, you may remember the colour as it was your favourite, but not the model. This means you will not store both pieces of information and only the colour is likely to be recalled at a later time. Storing is also important as it creates a neural network relating to the information in the brain. Retrieval is the final step in being able to recall information and will only occur if the first two stages have been completed properly. We will explore problems with retrieval in more depth later in this chapter. Memorising

BASIC PROCESSES	COMPUTER	HUMAN
Encoding	**Encoding** in a computer requires turning information into a representation made of binary code (1s and 0s).	**Encoding** in a human requires processing incoming information from the senses by giving it meaning.
Storage	**Storing** in a computer comprises the use of folders and files in a hierarchical system.	**Storing** in a human involves forming new neural networks between the incoming information and previously learned information.
Retrieval	**Retrieving** in a computer requires the loading of the folders and files from the memory storage to the central processing unit.	**Retrieving** in a human requires the reactivation of the neural network, bringing the information into the working memory for use.

Figure 1.1.2: Comparison of the basic processes in human memory to that of a computer.

and recalling information cannot occur without these three processes being successfully completed.

Learning is the process of acquiring new knowledge that can be used in practical ways. To accomplish this, the new information is assimilated into long term memory by relating it to previously learned information. Memory aids the learning process as we use previous learning to link to our new information and create new memories. The newly learned information also provides us with new memories for recall and use. However, learning is different from memory as the new information is seen as important, so is considered at a deeper level than simple recall. The new information can then be applied in different contexts giving it a practical use. In summary, memory aids learning, which in turn, allows the new information to be considered, understood at a deeper level and then applied to different contexts.

1.2 MODAL MODEL OF MEMORY

In the modal model of memory, memory consists of three stores: a sensory register, short-term memory (STM), and long-term memory (LTM).

- Describe how each store has its own characteristics in terms of capacity and duration.
- Describe the differences between procedural, episodic, and semantic memory.

Information remembered with conscious effort uses explicit memory, while information remembered unconsciously and effortlessly uses implicit memory.

- Determine whether procedural, episodic, and semantic memories are explicit or implicit.

2023 Subject Outline | Stage 1

The **modal model of memory** uses the stages from the information processing model but defines three different memory stores with distinct properties. Atkinson and Shiffrin proposed the 3-stage model of memory in 1968, which has since been developed by psychologists into the model presented below.

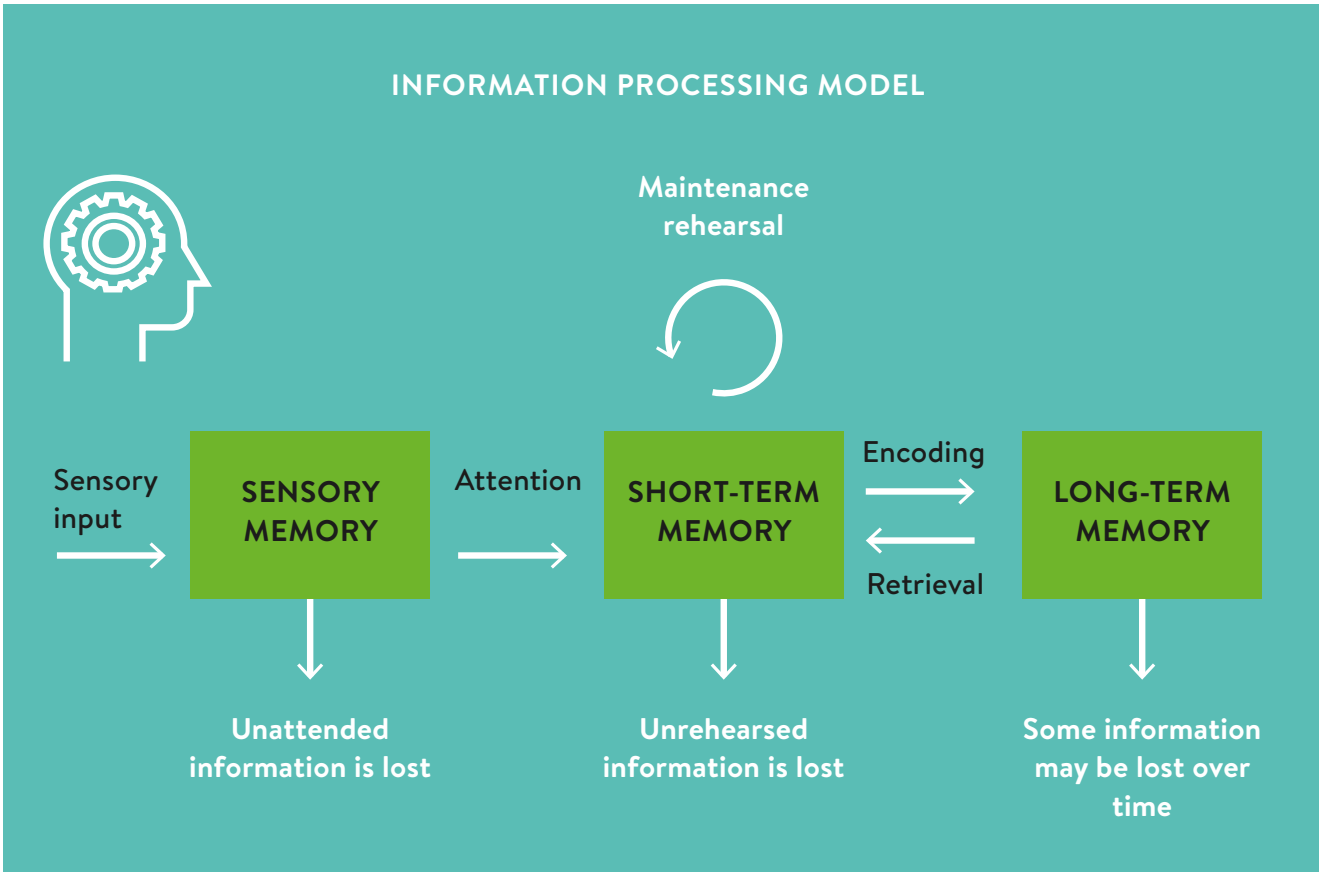


Figure 1.2.1: The Information Processing Model of Memory according to Atkinson and Shiffrin.

Sensory Register

We experience sensory input in a vast variety of ways. You have probably learned about the basic five senses that humans experience, but there are many more that give us vital information. For example, the vestibular sense helps us to know what orientation we are in relation to gravity. However, we would be overwhelmed if we paid attention to all of our sensory information at once, so we only pay attention to that which is deemed as important. This must occur within a few seconds or the information is lost. Imagine watching a sparkler trace through the air. You can recall the shape for a couple of seconds using iconic (visual) memory. Likewise, when you hear someone speak then are asked what they just said, you can recall the last few seconds of information using echoic (auditory) memory.

Short Term Memory

If attention is paid to the sensory information, it is moved to the **short-term memory store**. This can hold about 7 ± 2 items of information for between fifteen to thirty seconds duration. This has a large capacity but the information is easily lost to prevent the mind from overload. The most researched areas of this store include auditory (hearing), spatial (positioning in space) and visual. However, this information can come from all of the senses.

Research on the short-term memory started as early as 1887, when Joseph Jacobs created a digit span test similar to the activity below. He asked people to recall a string of numbers, increasing by one each time until no more could be remembered. He found that an average of 7 digits were able to be recalled accurately. George Miller (1956) introduced the idea of 'chunks' of information and added that we could remember 2 less than or 2 more than 7 of these in our short-term memory.

STUDENT ACTIVITY 1

Instructions:

1. Find a partner and decide who will be the participant and experimenter. Make sure the participant cannot see the following charts.
2. The experimenter reads one line out at a time, while the participant immediately recalls the line out loud.
3. Keep working through the lines on the chart in this way until the participant's recall is no longer accurate. Record how many digits were recalled correctly.
4. Repeat the same process for the lines of letters. Record how many letters were correctly recalled.
5. Compare your findings to those of Jacobs.

NUMBER CHART	LETTER CHART
2	H
64	AL
109	NUW
3856	SHFO
27185	OGBSY
751349	SBKEYA
9461825	WOVUABR
29461846	OCNSLWBA
401735298	PWEHNRUNL
8372015634	KSNWUGBAPQ
91037561739	CUSHEKFZSMA

STUDENT ACTIVITY 2

Read the following list of letters quickly, then cover them up and write them down in the same order as they appear on the page.

XGUWZSPJQLTBFMK

Now do the same with this list.

BAQ KIB MEP GUJ VOF

Now this.

BIT KEG SUN LAW TOY

The first string of 15 letters is nonsensical and difficult to remember, but the second gives 5 chunks that are easier to recall as separate pieces of information. The third is easier again as we can assign meaning to the chunks.

In 1959 Peterson and Peterson conducted an experiment to test short-term memory duration when rehearsal of the information was prevented. They provided participants with trigrams (groups of three consonants) to recall, then asked them to count backwards by threes or fours. This is known as a distractor task and aimed to prevent the participants from repeating the trigrams over and over. They then tested participant recall at different time intervals and found the results shown in the graph below.

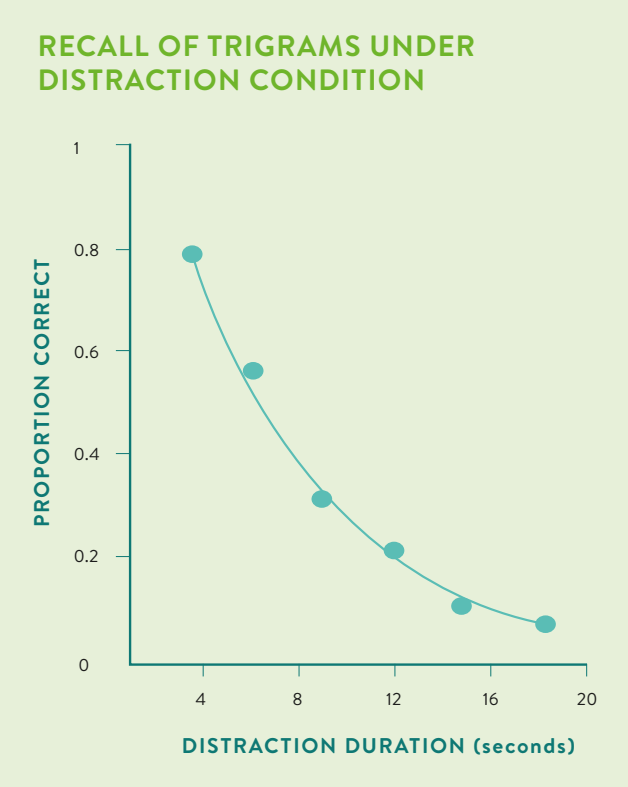


Figure 1.2.2: Proportion of consonant trigrams correctly recalled as a function of task duration from Peterson & Peterson, 1959.

The results showed that after only 18 seconds, correct recall had declined to less than 10%. However, when rehearsal is not prevented Atkinson & Shiffrin (1971) proposed that the duration of the short-term memory could extend to as long as 30 seconds.

Rehearsal

There are two types of rehearsal recognized by psychologists: maintenance rehearsal and elaborative rehearsal. **Maintenance rehearsal** consists of repeating the information over and over either verbally or in your head, while **elaborative rehearsal** involves reorganizing new information in a meaningful way. Both are used as methods of encoding information from the short-term memory store to move into the long-term store. We also now know that rehearsal strengthens the neural networks relating to these concepts, making them easier to recall later.

Long-term Memory

Once information has been encoded, it moves to the **long-term memory store.** This has an unlimited capacity, but information can fade over time if it is not rehearsed frequently. This means that the duration of the long-term store is theoretically unlimited, but in reality we often forget information over time. The way a memory is encoded also impacts its longevity, along with emotional and motivational factors.

In 1975 Bahrick, Bahrick and Wittinger tested 392 students graduating from university on the names of their classmates from High School. The recall rate was 90% up to 15 years later, but had only declined to 60% after 48 years. As the task involved matching names and faces, it was concluded that with sufficient meaning assigned to information the long-term memory could almost have a life-time duration.

	SENSORY REGISTER	SHORT-TERM MEMORY (STM)	LONG-TERM MEMORY (LTM)
Capacity	Depends on selective attention	7 ± 2 items (chunks) of information	Limitless
Duration	A few seconds	Varies from 15 to 30 seconds, increases with rehearsal	Limitless, aided by rehearsal, otherwise can be lost over time
Function	Registers 'raw' sensory information	Receives info. from the sensory register, encodes it using info. from the LTM	Stores huge amount of information over a long period of time, aids learning

Figure 1.2.3: Summary of the features of each memory store.

CHECKING FOR UNDERSTANDING

Complete the following cloze activity using the words provided below.

The modal model of _____ theorises three different memory stores. The first is the sensory _____ which filters for _____ information that is important. Less important information may be lost, however, if attention is paid it is first stored in the _____ memory. If this information is given enough _____ rehearsal and is properly _____ it will be passed on to the _____ memory store. If not, the information will only last a short time before it is lost. Once in the long-term memory it may be _____ later or be lost over time.

WORD BANK

encoded	**short-term**	**long-term**	**memory**
retrieved	**maintenance**	**register**	**incoming**

TYPES OF LONG-TERM MEMORY

Psychologists have categorized different types of long-term memory. Information remembered with conscious effort uses **explicit memory** (the 'what'), while information remembered unconsciously and effortlessly uses **implicit memory** (the 'how'). These can also be subdivided into further types as seen in Figure 1.2.4.

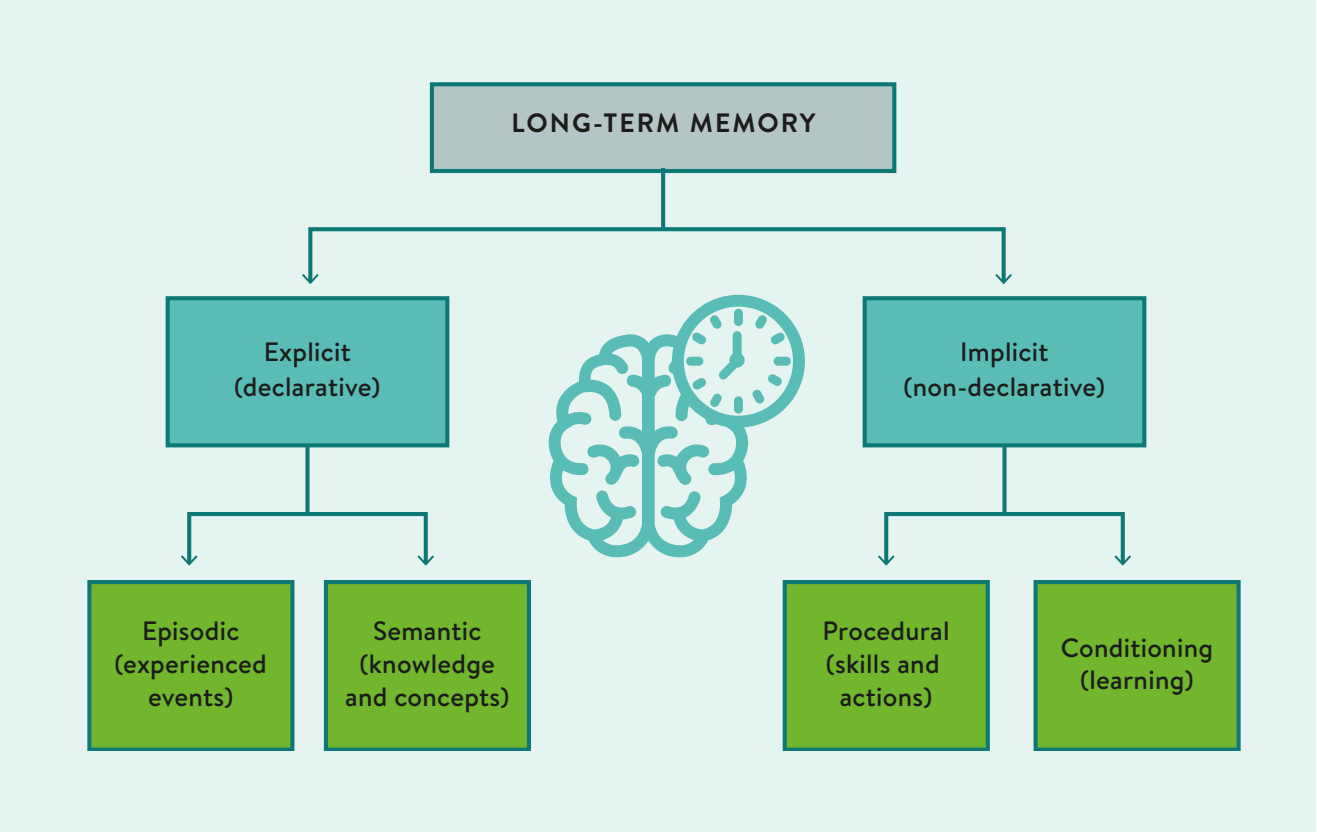


Figure 1.2.4: Sub-types of Long-term Memory.

EPISODIC MEMORY

Tulving in 1972 proposed that there were other types of long-term memory including episodic memory. This refers to our memories of events we have experienced in our lives and the details that surrounded this event. You can probably recall a recent birthday including where, how and with whom you celebrated. This is a type of explicit memory because you need to consciously be primed with the word 'birthday' in order to bring the memory of the event to mind.

SEMANTIC MEMORY

This is our stored knowledge of general facts and ideas. This usually involves conscious effort to learn the information and may require rehearsal if it is not related to our emotions. Semantic memory is a type of explicit memory because the knowledge will not be recalled unless it is needed. For example, you may be asked for the capital of a country as part of a quiz and have to search your memory for the answer.

PROCEDURAL MEMORY

This is our memory of how to carry out skills and actions. You will have used this when learning to drive a car or ride a bicycle for the first time. It also requires conscious effort to learn but then becomes habit after repetition making it a type of implicit memory.

CONDITIONING (LEARNING)

This refers to the process of being conditioned to have a specific response to a stimulus. This either involves strong emotions being associated with a single event or repetition of a stimulus being paired with another stimulus to create the desired response. An example of conditioning is shell shock which was experienced by people coming back from wars, where certain sounds might trigger a panic response. This was not consciously learned but will be recalled implicitly as they have no control over their body's physiological stress response.

Additions to the model

WORKING MEMORY

The Modal Model of Memory has been refined by psychologists such as Baddeley and Hitch to include an addition to the short-term memory in the functions of the **working memory**. They proposed that people had a separate system to process visual information (the **visuo-spatial sketchpad**) from what was used in processing auditory information (the **phonological loop**). These two systems are managed by the **central executive** which allocates memories to one of the systems. This explained why people were able to listen to one stimulus while also taking in visual cues, however, it is much more difficult to listen to two stimuli at the same time and make sense of both.

SCIENCE AS A HUMAN ENDEAVOUR

The Modal Model of Memory has had many refinements in recent decades. Investigate the **Development and Applications** of the model.

Development and Application

- Discuss how developments in research have led to advancements in the modal model of memory.
- Discuss any research techniques or new technologies that have allowed this research to make new findings.
- Explain how the new versions of the model might be used in an educational setting.

HELPFUL ONLINE RESOURCES

Read about how technology is being used in the latest research in Memory: https://tinyurl.com/9pnjh7hh

CHECKING FOR UNDERSTANDING

Fill in the boxes below with examples of each type of long-term memory that are personally relevant to you.

Episodic Memory	Example: You remember where you were when you heard a famous person had died.
Semantic Memory	Example:
Procedural Memory	Example:

CASE STUDY: CLIVE WEARING

Clive Wearing is commonly referred to as 'the man with the 30 second memory' due to the amnesia he suffers after a brain infection contracted over 35 years ago.

Prior to his illness, Wearing was an accomplished musician and conductor, living in London with his wife Deborah. He worked for the BBC and created musical scores for the London Opera Centre.

In 1985, Wearing contracted meningoencephalitis, an infection in the meninges, the thin layers of tissue that surround the brain. The disease is often fatal when left untreated because neurons are harmed by both the infection itself and the inflammation it causes. While some sufferers of the disease recover completely without ongoing symptoms, some severe cases can cause long-term, permanent brain damage, as it did for Clive Wearing.

Due to the attack on the central nervous system, Wearing was left unable to store new memories. He also struggled to regulate his emotions and often exhibited unstable moods.

Much of the damage caused by the encephalitis occurred to the hippocampus, a structure in the temporal lobe responsible for the formation of long-term memories. Because of this, Wearing suffers from total amnesia, rendering him incapable of forming new memories. Wearing's short term memory lasts between seven and thirty seconds.

Wearing spends his day believing that he just woke up, as he cannot remember what he has done prior to that moment in time. He believes that he has just come out of the coma that was the result of his encephalitis, constantly asking why he has not seen a doctor to assist with his condition. He cannot maintain conversation as he lacks the ability to follow the flow of dialogue and remember the topics being discussed.

Just one year before suffering from encephalitis, Clive married Deborah, his second wife. He has children from a previous marriage but cannot remember their names nor the details of their lives. His love for Deborah is obvious as each time she walks into a room, Wearing believes he is seeing her for the first time. He greets her with the joy and passion of a man who desperately missed his lover during a long absence.

Despite having no memory of his time as a musician or composer, and no longer being able to identify pieces of music based on their titles, Wearing is still able to play the piano, as well as sight-read music.

When interviewed for a documentary in 2005, Wearing was asked if he missed his old life, to which he replied: "Yes. But I've never been conscious to think that. So, I've never been bored or upset. I've never been anything at all, it's exactly the same as death. No dreams even. Day and night, the same."

Figure 1.2.5: Clive Wearing and his wife, Deborah.

HELPFUL ONLINE RESOURCES

The Real 50 First Dates: Meet the man with a 30 second memory | 60 Minutes Australia: **https://tinyurl.com/292v6drh**

SCIENCE AS A HUMAN ENDEAVOUR

Human memory and computer models of memory such as those used in Artificial Intelligence (AI), have both been research widely throughout the last few decades. There is a growing field of study called Computational Neuroscience that encompasses these ideas. Research and write a discussion about how these developments in computer memory models have advanced knowledge about human memory. Useful websites:

https://tinyurl.com/2mcjueuv

https://tinyurl.com/yvtx6ptv

https://tinyurl.com/mudey92p

https://tinyurl.com/3dwyeexz

SCIENCE INQUIRY SKILLS (SIS)

1. **Evaluate the modal model of memory for its strengths and weaknesses. How strong is the evidence, given that it used simple recall experiments only? Are there other processes/factors that were not considered?**

2. **Discuss the strengths and weaknesses of using experimental designs in investigating memory.**

3. **Discuss the strengths and weaknesses of using objective and quantitative data when investigating memory.**

1.3 LEVELS OF PROCESSING

The levels of processing model considers the depth of processing involved in memory.

Learning Objectives:

- Explain how shallow processing differs from deep processing.
- Compare the effectiveness of shallow processing with deep processing in promoting retention.

2023 Subject Outline | Stage 1

In 1972 Craik and Lockhart decided that mere repetition of information was not enough to explain why some memories lasted longer than others. They proposed that the way we process the information at the encoding stage was the most important factor in whether we would later recall it. The framework proposed three levels resulting in different levels of depth, shown in Figure 1.3.1.

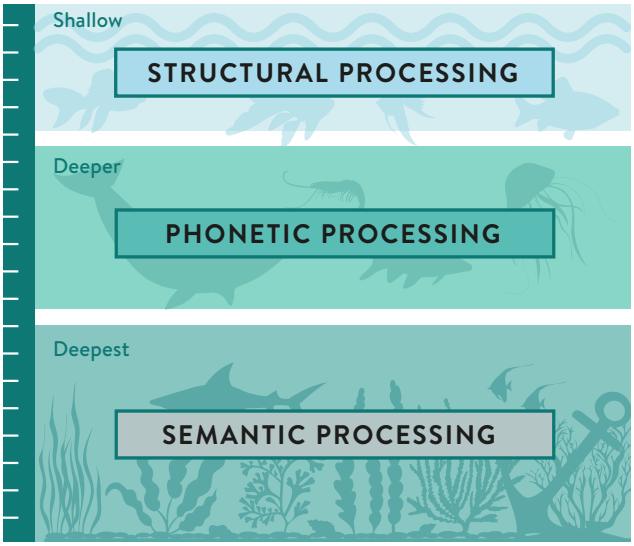


Figure 1.3.1: Levels of Processing according to Craik and Lockhart.

Structural processing occurs where information is processed on its visual features only. In terms of word lists this could be the use of capital or lowercase letters, or perhaps the shape of the word. According to Craik and Lockhart's levels of processing theory, this shallow level of processing results in rapid decay of the information.

Phonetic processing occurs where information is processed by its sound only. This could mean that the word lists are read out loud or that a rhyming word is thought of. It was suggested that this processing occurred at an intermediate level as it would decay less rapidly than structural processing.

Semantic processing involves making sense of the information in terms of what is already understood. With a word list this could involve assigning meaning to the words with a task such as putting them into an appropriate sentence. This provides the deepest level of processing and therefore, is more likely to be retained in the long-term memory for longer than the other levels of processing. Semantic processing is the preferable option for learning important information as it is less likely to be forgotten and is able to be used in practical ways due to the deeper level of understanding produced.

CHECKING FOR UNDERSTANDING

Identify the correct level of processing for each learning activity.

Activity	Structural Processing	Phonetic Processing	Semantic Processing
Writing down words from the board			
Watching a video about a topic			
Writing a paragraph using key words provided			
Listening to a list of words being read out			
Hearing words broken into syllables			
Comparing the meaning of words to each other			
Putting information into your own summary			
Breaking down words into syllables on your page			
Creating a mind map linking similar ideas			
Taking your own notes from a video			

SCIENCE INQUIRY SKILLS (SIS)

Practise designing an experiment testing recall for different levels of processing using the steps below.

1. Choose a type of research design.

- ☐ Repeated Measures (same participants are used in each condition)
- ☐ Matched Pairs (participants matched on a particular measure are put into different conditions)
- ☐ Independent Groups (different participants are used in each condition)

2. Write a hypothesis for this experiment.

Participants who ..

will show ..

3. Write a detailed method for each condition.

Structural Processing Condition:

..

..

..

Phonetic Processing Condition:

..

..

..

Semantic Processing Condition:

..

..

..

4. Explain how the results will be measured and recorded.

..

..

..

..

..

..

5. Describe how the results will be graphed.

..

..

..

..

..

..

1.4 DISPLACEMENT THEORY OF FORGETTING

Forgetting information from short-term memory (STM) can be explained.

Learning Objectives:

- Use the theory of displacement to explain the forgetting of information from STM.

2023 Subject Outline | Stage 1

There are many theories in psychology around why we forget information. The displacement theory uses the concepts of the primacy and recency effects and focuses on the STM. The **primacy effect** suggests that we remember information near the beginning of a set due to our use of rehearsal to store it in the long-term memory, while the **recency effect** means that we also remember information near the end of a set using our short-term memory. Murdock (1962) obtained similar results to the graph below using recall of a list of words presented for one or two seconds. He found that the probability of recall related to the position of the word in the list (its serial position). It was hypothesized that when new information enters the STM, the older information is replaced by the new. This is what is meant by '**displacement**'. The theory of displacement proposes that due to the limited capacity of the STM, once this store is full, new memories will replace the older memories.

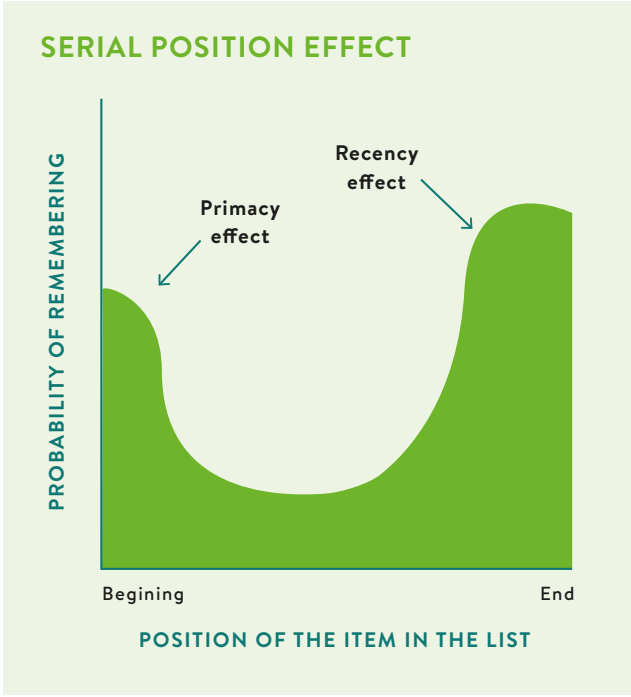


Figure 1.4.1: Serial position effect curve.

SCIENCE INQUIRY SKILLS (SIS)

Design and Deconstruct Investigation ideas:

- **Investigate Primacy and Recency effects in different types of learning tasks.**
- **Investigate capacity of STM when under different distraction conditions.**
- **Investigate duration of STM with different modes of stimuli (e.g. hearing versus seeing information.)**

Note: For a SACE Stage 1 student investigation design the outcome must be uncertain so a variable must be used that has not been previously researched.

HELPFUL ONLINE RESOURCES

Watch the video about how the serial position effect can be explained in terms of the modal model of memory.
https://tinyurl.com/bdhdhezr

1.5 OTHER THEORIES OF FORGETTING

Forgetting information from long-term memory (LTM) can be explained in a number of ways.

Learning Objectives:

- Explain the difference between proactive and retroactive interference.
- Use the theory of retrieval failure to explain forgetting from LTM.
- Use the decay theory to explain the forgetting of information from LTM.
- Explain forgetting from LTM using the lack of consolidation theory

2023 Subject Outline | Stage 1

Other theories of forgetting focus on the LTM store. One explanation for forgetting information lies in **interference theory**. Interference theory suggests that retrieval may be impacted by similar information being confused with the memory. **Proactive interference** occurs when previously learned information interferes with the new memories being created. An example of this might be when you drive to the wrong workplace because you worked there a year ago, but no longer do. **Retroactive interference** occurs when the new information being learned interferes with what was already known. An example of this might be learning a word in French, then later learning the German word for the same item but forgetting the French translation. Both of these ideas suggest that we confuse our information so that it is no longer accurately recalled. However, retrieval failure may occur in other ways.

Retrieval failure is said to occur when we don't receive the correct retrieval cues to access the memory pathway in the LTM store. **Retrieval cues** are stimuli in our environment that were present when the memory was formed. These could be visual cues such as the face of the person in front of you or other sensory cues such as the scent of a perfume you were wearing at the time. In 1975 Godden and Baddeley explored the impact of different contexts on recall. They asked scuba divers to learn a list of words on land or under water. They were then asked to recall the words in either of these contexts using a repeated measures experimental design. The participants showed better recall when the context for learning matched the context for recall, i.e. learning under water was recalled better under water than on land and learning on land was recalled better on land than under water. This suggests that **context-dependent cues** are important to recall and without them we may find ourselves searching for information we are sure we know. Have you ever walked into a room only to forget why you have come there? Often when you return to the location where the thought occurred to you, you will be able to remember what it was.

It has also been shown that the state of consciousness in which we learn information can impact our recall. This is

Figure 1.5.1: A scuba diver like those used in the study by Godden and Baddeley into context-dependent cues for memory retrieval.

thought to happen at the encoding stage and the internal stimuli in our bodies are known as **state-dependent cues**. Experiments using drugs have been used to show that people who are under the influence of a specific drug will recall information better when they were under the same drug's influence as it was learned. We can also apply this knowledge to mood.

SCIENCE INQUIRY SKILLS (SIS)

Explain why research into state-dependent memory cues on humans and animals may be unethical.

DECAY THEORY

As far back as 1885, Ebbinghaus theorized that the brain's ability to recall information over time without rehearsal

decayed in an exponential **forgetting curve**. This means that the loss of information is rapid in the first few days, but slows to a lower rate beyond that time and continues asymptotically, never fully fading.
Although Ebbinghaus conducted his experiments on himself only, this curve has since been replicated in further studies and is widely used to represent human forgetting.

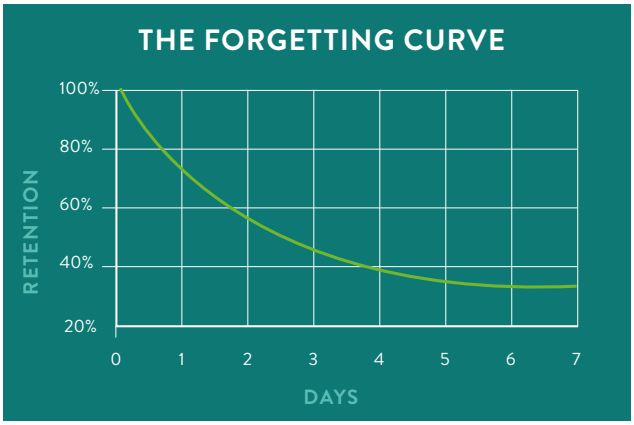


Figure 1.5.2: Ebbinghaus' Forgetting Curve for Long-term Memory.

The decay theory states that without rehearsal or revisiting information, our memories will fade over time. This means that they will prove more difficult to retrieve and that their accuracy will be diminished as time passes.

The **consolidation theory** of memory suggests that rather than decaying instantly, information in the LTM actually needs time to cement itself into stored information. This means that if we don't give sufficient time for a memory to consolidate, it may not be remembered. An example of this might be revising for a test just before going to sleep. This supposedly gives your brain enough time to consolidate the information during the night and should be remembered well in the morning. The theory came about due to cases of brain damage impacting newer memories, but not those formed earlier in life. It is thought that structural changes in the brain may underlie this phenomenon. This leads us to understand that there are certain biological impacts on forgetting.

CHECKING FOR UNDERSTANDING

Fill in the table below with definitions of the term and examples of your own.

TERM	DEFINITION	EXAMPLE
Proactive interference		
Retroactive interference		
Retrieval cues		
Context-dependent cues		
State-dependent cues		
Memory Consolidation		

SCIENCE INQUIRY SKILLS (SIS)

Design and Deconstruct ideas:

- Investigate proactive and/or retroactive interference
- Investigate Ebbinghaus's forgetting curve (duration of LTM)
- Investigate the impact of context-dependent cues on recall

Note: For a SACE Stage 1 student investigation design the outcome must be uncertain so another variable must be introduced that has not been previously researched.

1.6 BIOLOGICAL CAUSES OF FORGETTING

There are also biological explanations for forgetting.

Learning Objectives:

- Describe how memory problems in people with Alzheimer's disease change over time.
- Explain the memory problems in people with Alzheimer's disease.

2023 Subject Outline | Stage 1

All people experience **cognitive decline** as they age that decreases their ability to learn, solve problems and use their memory. However, **Alzheimer's disease** has a clear biological cause and is characterized by a decline in memory function. Alzheimer's disease is thought to be caused by an abnormal build-up of amyloid plaques around brain cells and tau tangles within brain cells. These two abnormal forms of proteins have been shown to be more prevalent in the brains of people who have died from Alzheimer's disease, but it is still unknown how they are caused. What we do know is that people with the disease tend to suffer from an early decline in cognitive functions such as memory and thinking skills. Over time this can lead to an inability to carry out simple tasks such as comprehending language, carrying out routine tasks and swallowing food. There is no cure or treatment for the disease, and it affects up to 1 in 10 Australians over the age of 65 years and up to 3 in 10 Australians over 85 (healthdirect.gov.au).

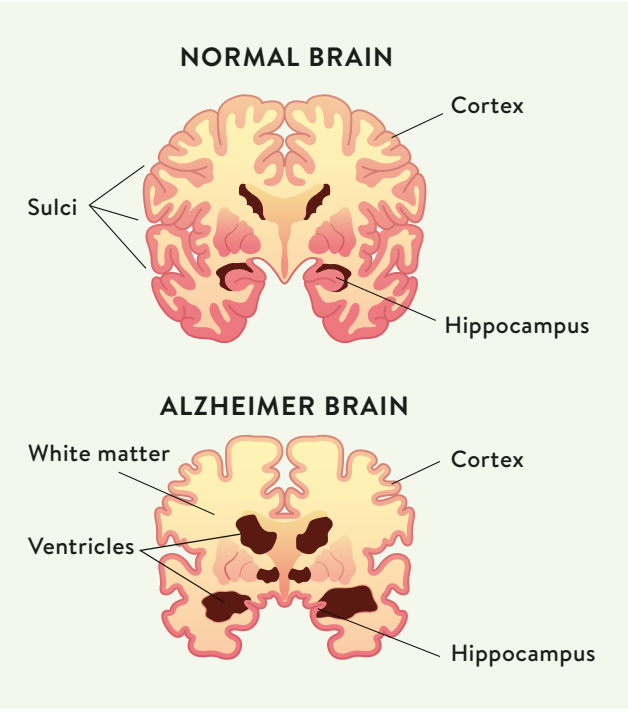


Figure 1.6.1: changes in the brain due to Alzheimer's Disease.

The disease initially affects the outer layer of the brain which is responsible for learning and short-term memory, but moves progressively inwards to impact other functions such as language, reason and social behaviour, before moving to those parts important for body regulation. The Hippocampus is a region in the brain that plays a significant role in memory and is heavily affected as the disease advances. It is understood that Alzheimer's disease causes a loss of connections between neurons over time.

HELPFUL ONLINE RESOURCES

Watch the following video to combine your understanding of Neuropsychology with the causes of Alzheimer's disease.
https://tinyurl.com/mths4s5x

The symptoms for Alzheimer's disease can begin in mid-life (usually mid-60s) and typically consist of memory issues, confusion, mood swings and changes in social skills. In the first stage of the disease the short-term memory is impacted and recall of recent events can be difficult. People with this mild level of Alzheimer's disease will experience symptoms such as confusion, disorientation and find it difficult to grasp complex ideas or adapt to changes.

Throughout the second stage, patients with Alzheimer's disease may experience more significant impacts such as forgetting to finish routine tasks, forgetting names of family members and friends, and becoming repetitive. In worse cases they may experience poor decision-making, emotions such as anger and frustration and neglecting important tasks such as attending to personal hygiene and eating. They can also experience fluctuations in functioning such as the ability to recall events which may be normal one day and not the next. For example, not recognising family members but remembering the name of their primary school teachers and neighbours where they grew up.

HELPFUL ONLINE RESOURCES

Find out more about Alzheimer's disease and the symptoms associated with each stage at the Dementia Australia website.
https://tinyurl.com/2974h2p8

The final stage of the disease may see people losing their long-term memories of important life events or earlier life experiences. Over time the neural pathways are no longer available which ceases recall permanently. They can lose their ability to use and understanding language entirely and have difficulty with basic movement. At this point people are almost completely reliant on others to care for their daily needs.

Alzheimer's patients often have trouble recalling recent events, but can recall earlier events in their lives, which can provide comfort as they relive familiar times. In some countries, facilities have been established to recreate past settings, providing comfort and familiarity for patients. However, for family members, it can be challenging to witness their loved one's decline as they become increasingly dependent on others for daily tasks.

HELPFUL ONLINE RESOURCES

Watch this video about a 1950s town that has been created to care for Alzheimer's patients.
https://tinyurl.com/msf7t3h6

SCIENCE AS A HUMAN ENDEAVOUR

New research in Alzheimer's disease is being carried out all the time. Find an article about new research in this area. Explore it for the SHE aspects listed below.

Communication and Collaboration

- Investigate who funded the research and whether more than one institution was involved. Explain how this constitutes collaboration between researchers.
- Detail any collaborations or funding that may have come from other stakeholders including those who may have been impacted by the illness.
- Describe how the findings were reported and explain the aim of sharing scientific findings with other researchers and the wider community.
- Describe the different skills and experience of researchers involved showing how different disciplines work together to create evidence.

Development and Application

- Discuss any research techniques or new technologies that were developed by others and used in this research. Explain how this has advanced psychological understanding about Alzheimer's disease.
- Explain how the research might be used in the future either to support those living with the disease or in forming treatments or preventions.

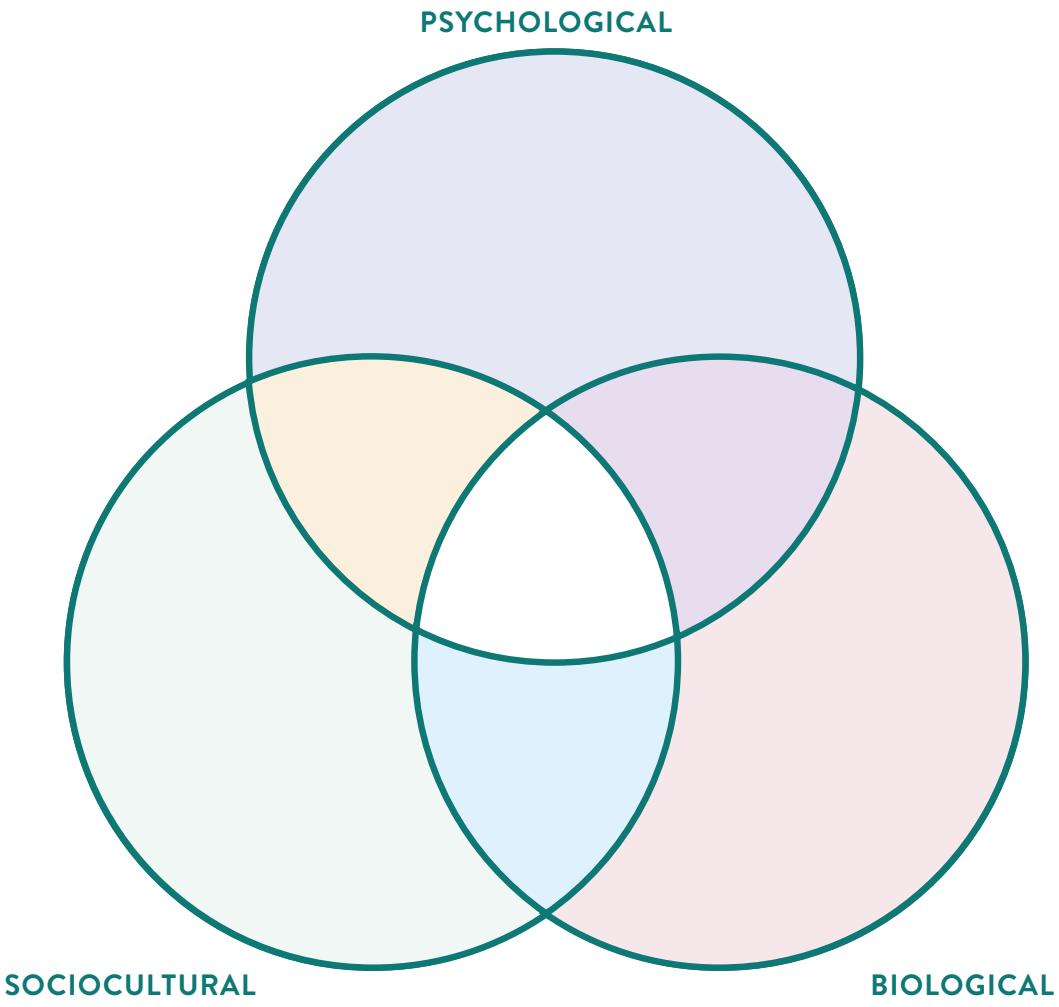
Influence

- Explain how economic and sociocultural impacts of Alzheimer's disease may have led to the research being conducted.
- Describe how the research findings might impact economic and sociocultural perspectives at a local, national and global level.
- Describe any positive, negative or unexpected consequences of the research findings.

CHECKING FOR UNDERSTANDING

Risk factors for Alzheimer's disease are listed below. Place these into appropriate positions in the **biopsychosocial model of health.**

- Advancing Age
- Unhealthy diet
- Genetic mutation
- Low level of education
- Lack of physical activity
- Lack of mental stimulation
- Family history of the disease
- Head injury
- Social Isolation
- Smoking



EXTENSION MATERIALS

Other biological impacts on memory include the effects of brain injuries and psychological trauma including stress. **Concussions in sport** are becoming a greater concern with many sports now adopting rules around concussed players and making sure that medical staff at games are trained in dealing with them.

The AFL have created their own guidelines as well as an app for players. Explore the information here for how this is shaping Australian sport. **https://tinyurl.com/3n63pf22**

Watch this TED-Ed video to explore the **effects of stress on memory**. **https://tinyurl.com/4cz7tbjp**

There are also some concepts used here that are covered in more detail in the Neuropsychology topic on pages 72 to 74.

1.7 CULTURAL INFLUENCES ON MEMORY

Research has shown that culture helps shape memory.

Learning Objectives:

- Describe examples of how culture influences what is remembered and how it is learned.
- Explain why observational designs or focus groups may have been used to obtain data about cultural differences in memory retention.
- Describe the advantages and disadvantages of observational designs and focus groups in researching how culture influences memory retention.

2023 Subject Outline | Stage 1

Research by Mullen in 1994 gave questionnaires to different demographics about the age they were at their earliest memory. Her findings indicated that cultural impacts such as the discussions of adults around the events led to earlier memory formation. These results have been explored in further research, giving wider support for the findings in different cultures. In fact the main difference between cultures in terms of long term memory effects seems to be individualism versus collectivism. Individualist cultures are those that promote the individual, while collectivist cultures tend to focus on contributions to a group such as family. Findings from many studies tend to show that individualist cultures focus more on memories that are based on objects, relate to the self and are categorically related while collectivist cultures focus more on contextual details, similarities, and information relevant to their group. This means that the same information may be remembered in a variety of ways and therefore, the retrieval cues will be different depending on our cultural influences.

In Australia and the Torres Strait, rich traditions of instruction have been passed on for centuries through storytelling (yarning), song, dance and artworks. The stories range from collective histories and spiritual narratives (creation stories) to cultural practices and life histories. This includes songlines which create mental 'maps' of the land through memorization of songs. After the colonization of Australia, these **oral histories** were not as highly regarded as factual or written records, however, they have persevered over vast time periods and should be accepted as a reliable way of passing information from generation to generation. These cultural practices have played a vital role in shaping the cultural heritage of these communities.

EXTENSION ACTIVITY

Investigate a creation story from your local area and discuss how and why this has been passed down through generations.

Research designs in the area of cultural impacts on memory generally use **observational** or **focus group designs** as these are **qualitative** in nature. Only open-ended survey questions or in-depth discussion can bring to light factors that may not have been considered before.

Observational designs use existing situations and consider the variables already involved without using contrived settings or scenarios. This gives them high ecological validity as they are researching people in the typical situation within which the behaviour takes place. In the case of cultural impacts on memory retention, it is important to measure the behaviour within the context of the culture itself as this can add to our understanding as well as protect participants from undue psychological harm if removed from their culture. Focus group designs give people a chance to discuss anything that is not directly asked by the researcher but may still be important to the investigation. This provides deep and rich information that can give more context to our understanding of the cultural perspectives. In the case of memory retention, there may be other factors at play that have not been considered.

Individual differences shape the way all people experience memory so having participants from different demographics such as levels of education can also help to find patterns in the data. This means that qualitative designs are very useful in furthering our understanding of

HELPFUL ONLINE RESOURCES

Watch lecturer in Aboriginal History Colin Jones explain the use of songlines in the video below.
https://tinyurl.com/yw2yb3r6

memory. However, this can make analysing the data more difficult as researchers are not always sure of what they are looking for and may need to sort through hours of focus group transcripts or consider different variables before coming to any meaningful conclusions. It can also be difficult to establish causality between variables as none have been controlled and individual opinions could be deemed unimportant in favor of more common themes. Ethical consideration of how the results could be interpreted or how the participant demographics are analysed must also be carefully considered in order to minimise the potential misinterpretation or misuse of data.

1.8 ENHANCING MEMORY

Strategies can be used to enhance memory.

Learning Objectives:

- Describe how mnemonic strategies could be used to improve memory.
- Explain how the following affect memory:
  - Massed versus distributed practice
  - Over-learning
  - Context dependence.
- Describe how the level of processing (shallow vs. deep) affects memory.
- Describe how the following techniques are being used to improve memory:
  - Implanted electrodes in the brain
  - Transcranial magnetic stimulation.
- Discuss the advantages and disadvantages of these technological manipulations.

2023 Subject Outline | Stage 1

There are a number of ways to improve our memory using strategies known as **mnemonics**, which aim to enhance the brain's ability to encode and store information in more effective ways. Often these mnemonics use the underlying mechanisms of memory outlined earlier in this chapter so these will be used to explain how each mnemonic works.

CLUSTERING

The **clustering** technique uses the knowledge that the STM can hold up to 7± 2 individual pieces of information at one time. Chunking information means grouping it into smaller chunks to stretch the STM to take in more information. Clustering uses this concept to put similar pieces of information into groups that can then be triggered by a single retrieval cue. For example, a shopping list might be grouped into toiletries, frozen foods, dry foods, fruit and vegetables. Clusters can also be grouped hierarchically, meaning that there may also be subgroups. In the above example this could involve using berries as a subgroup of the fruits cluster.

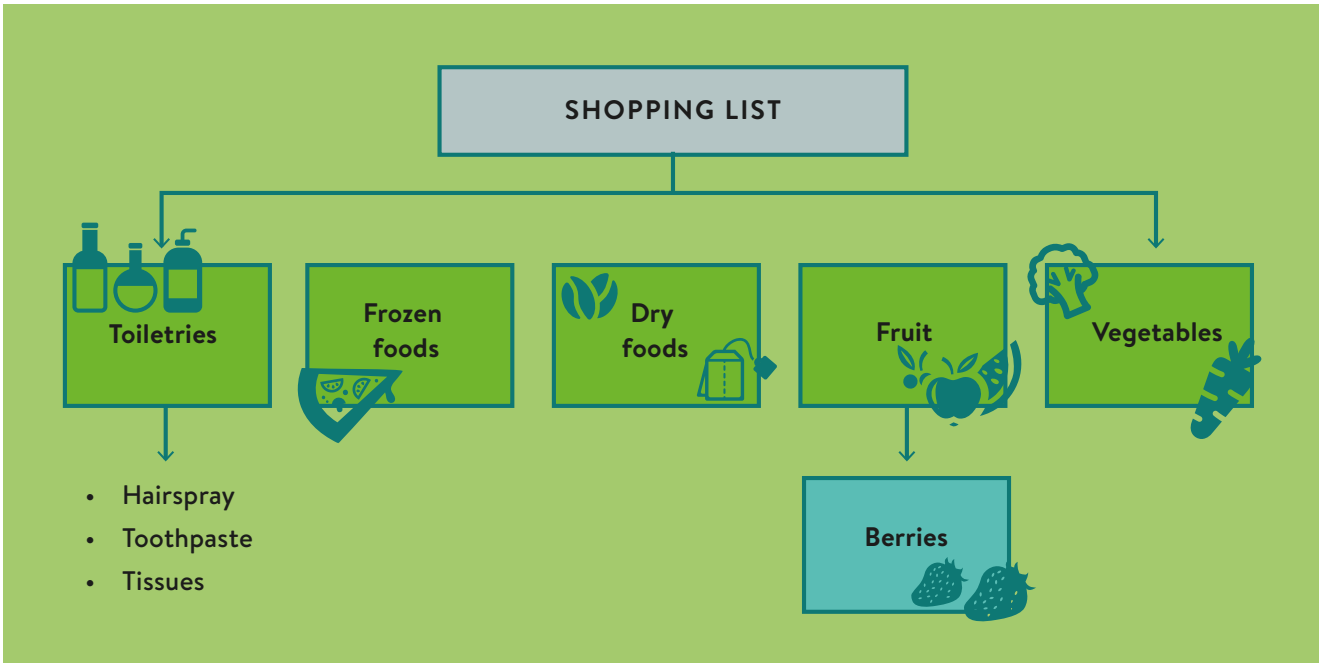


Figure 1.8.1: An example of the Clustering method used to recall items on a shopping list.

PEG WORD

The **peg word** method is a mnemonic strategy that involves the use of objects that are chosen to rhyme with individual pieces of information such as numbers. These objects can create mental images which encourage structural processing, while the use of rhyming induces phonetic processing. Using an object meaningful to you is most powerful as you are then using semantic processing to encode more simple information. This technique is often used for remembering the order of playing cards, for which there are international competitions.

Figure 1.8.2: An example of the use of the Peg word method of memory.

REWORKING

Reworking involves using the information in another way such as putting it into your own words or discussing it with someone else. This has the added bonus of using personally meaningful wording which adds to the semantic processing already at work. This acts to help you encode the information at a deeper level than simply taking in facts and is the best way to learn new information. This is essentially what you are required to do in your assessments at school as you are showing that you understand the concepts if you can rearrange them in a way that makes sense.

METHOD OF LOCI

The **method of loci** is the most elaborate mnemonic device as it requires three stages to be carried out to remember information. Firstly, each piece of information is linked to an object for which you can create a visual image. For example the word 'bird' might be linked to the image of a rubber duck. Secondly, you are asked to think of a physical location that is familiar to you such as a street or house. Finally, you place each of the objects in a specific location along a route through or past your familiar place. Mentally navigating through the route and visualizing the objects interacting with the positions you put them in should help you remember the information. For example, you might place the rubber duck into your bath-tub while moving through your house. This device uses semantic processing as you have assigned meaning to the information as well as

CHECKING FOR UNDERSTANDING

Compare two mnemonic devices. Which is likely to produce more long-lasting memories and why?

CHECKING FOR UNDERSTANDING

If you were to design an experiment to compare the effectiveness of both strategies, which would you keep the same: the participants in the groups or the information being learned? Justify your choice.

utilizing your LTM for the place you have chosen.

Massed Practice

Massed practice is the process of learning information in one intensive session. For example, you could learn about a topic in one lesson at school and not revisit the information again until it is time to be assessed. The chances of this information being retained in the LTM are limited unless it is deeply processed and there is no time for consolidation of the material before moving on to the next topic. Massed practice is said to be good for learning basic skills that do not require complex cognition such as physical actions.

Distributed practice

Distributed practice is where learning is revisited at spaced intervals which help to consolidate the learning and reactivate the neural pathways for the memory. For example, you could learn about the topic in a lesson, then revisit this learning a week later. By doing this you have retrieved the memory, strengthening the neural pathways and bringing it from your LTM back to STM (or working memory). Distributed practice can also be used to create multiple context-dependent cues depending on where you review the information, meaning that you are more likely to be able to remember the information in a variety of settings.

Ebbinghaus also looked at distributed practice in his studies of LTM. He found that with spaced learning, the forgetting curve changed shape for decay rates after each relearning session (note the steepness of the curves decreasing in Figure 1.8.3).

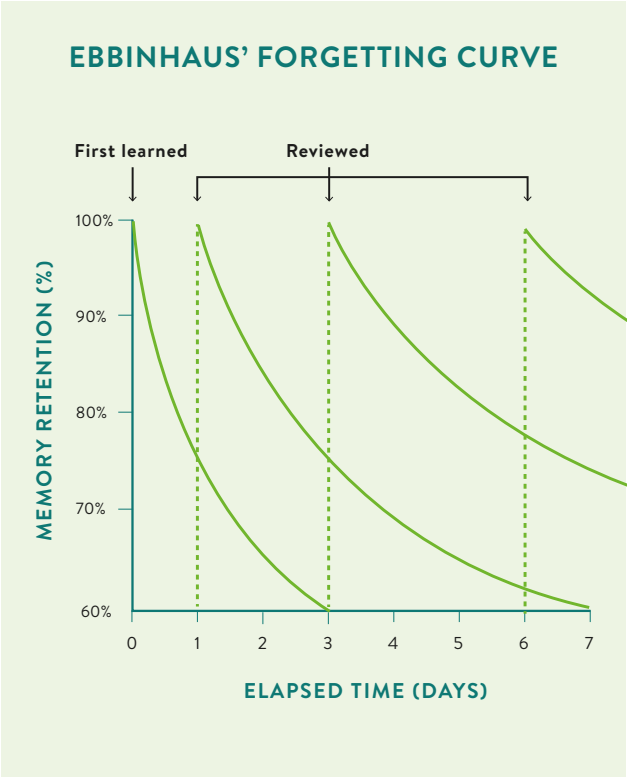


Figure 1.8.3: Ebbinhaus' Forgetting Curve with distributed practise improving memory retention.

Overlearning

Overlearning was also explored by Ebbinghaus who defined it as further learning taking place after the point at which information can be recalled with complete accuracy. Later studies into overlearning have found mixed results with physical skills seeming to increase in ability, while cognitive skills decline after overlearning has occurred. It also seems to be most useful when the information is not needed for long periods of time.

Context-dependence

We know from Godden and Baddeley's study with scuba divers that **context-dependent cues** are important for recall. For example, if you learn the information you are going to be tested on in the classroom for that subject, you are more likely to recall it on the test if it takes place in the same classroom. Likewise, if you study the required material at your homework desk, then work on an assessment piece there you are more likely to retrieve the learned material easily.

Level of Processing

We have also learned that deep processing, generally at the semantic (meaning) level will lead to improved retention of information as it has formed multiple connections to previously learned information in the LTM and widened the neural network in the brain. This means that the more meaning you can assign to information, the more likely you are to recall it later. Some people use stories or analogies to enhance this process.

CHECKING FOR UNDERSTANDING

Use two or three of the techniques mentioned above to formulate a study plan for this topic. State what you will do, then give reasoned justification using the psychological ideas mentioned in this section.

Memory Technologies

The use of memory implants or a 'hippocampal prosthesis' is a growing area of research, with initial studies showing a significant improvement in STM recall. It uses electrodes placed in the hippocampal regions of the brain to mimic people's individual brain activity when they are using the STM. This is then used to boost recall on further learning. These could be used in treating memory conditions such as amnesia and Alzheimer's disease but could also be chosen as upgrades to the human brain in future. People have very individualised brain activity when learning and recalling information, so it is important that treatments such as implants are responsive to each person's experience of memory.

Any technological devices that are inserted into the brain come with risks such as erosion of the materials over time. There are also concerns that enhancing a person's memory might change their personality. However, these are deemed to be outweighed by the benefits to an individual who is already suffering from impaired memory. The device also doesn't support recall, only storage meaning that issues with forgetting that are associated with recall only may not be improved by the technology.

Another use of technology to support memory enhancement seems to be transcranial magnetic stimulation (TMS). TMS involves passing a weak magnetic pulse through certain areas of the brain. While TMS has recently been used as a treatment for cases of chronic depression

where other treatments have failed to provide relief, used in a different way researchers have found some evidence that it can also increase retention of information. In these studies, TMS has been applied to the left pre-frontal cortex where much of our encoding and retrieval processes occur. This process enhances the neural connections involved with learning and memory. However, it is important to note that there are also many side effects from using TMS such as headaches, tinnitus and in rare cases epileptic seizures. This means that more research needs to be carried out before TMS can be used as a treatment for memory disorders.

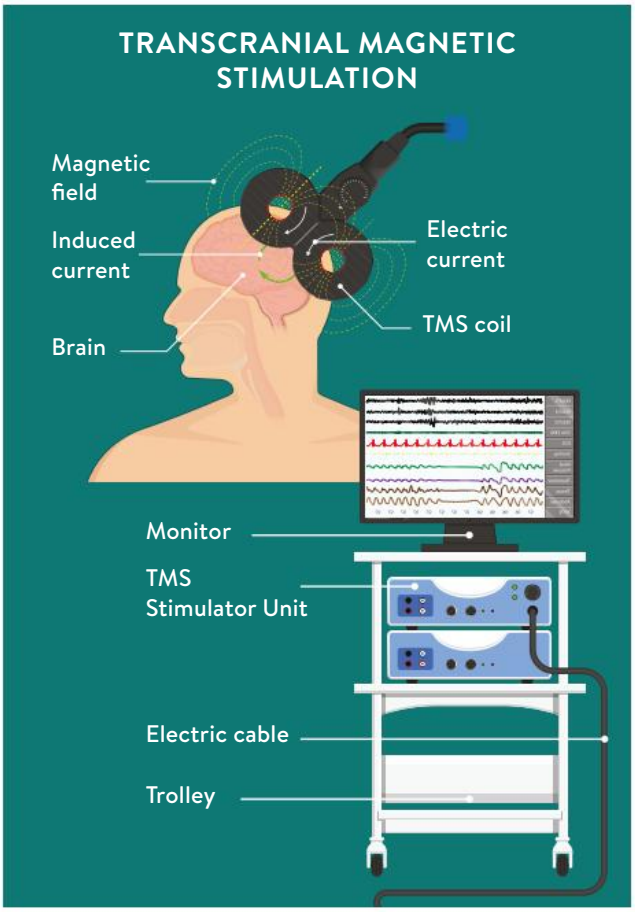


Figure 1.8.4: How Transcranial Magnetic Stimulation is performed.

POSSIBLE TEACHING CONSIDERATION

In pairs, create a podcast discussing one of the following topics. Partners could research one perspective each. Use referenced information that is prepared before the discussion but try not to script it so that a deeper understanding of the information can be shown.

Topics:

- Technology is both a problem and an aid when it comes to memory.
- Memory-boosting brain implants will impact our ability to learn both negatively and positively.
- Natural memory boosters such as ginkgo biloba have benefits and risks.

SCIENCE AS A HUMAN ENDEAVOUR

Research one specific type of memory enhancing technology such as those mentioned above. Explain how **developments** in technology have led to advances in our understanding of how human memory can be enhanced. Describe how these devices **apply** psychological understanding of memory function to develop solutions for people with memory issues.

1.9 SOCIAL INFLUENCES ON MEMORY

Social issues sometimes arise from faulty memories.

Learning Objectives:

- Explain how inaccurate eyewitness testimony can lead to false convictions. Factors to be considered include:
  - Leading questions
  - Schema
  - Selective attention
  - Confirmation bias
  - Similarity factors

2023 Subject Outline | Stage 1

Eyewitness testimony

Research into reconstructive memory (being able to recall details of an event) began with Bartlett in 1932 who showed participants a Native American ghost story and asked them to recall the story after varying intervals of time. His findings showed that participants tended to shorten the story, confuse unfamiliar parts of the story changing them to ideas more familiar and rationalize parts they could not understand. This led to more studies on reconstructive memory, particularly in the field of eyewitness testimony. Historically the testimonies of people who had witnessed a crime have had significant impacts on the outcome of trials sometimes leading to wrongful convictions due to the vulnerability to distortions in the recounts provided.

LEADING QUESTIONS

In 1974 Loftus and Palmer created a study that changed the wording of questions for participants who had witnessed a car crash. Participants were asked, 'About how fast were the cars going when they _____ each other?', with groups of participants being given different verbs (smashed, collided, bumped, hit, and contacted) in place of the blank. The speeds estimated by each group are shown in Figure 1.9.1 with speeds in miles per hour.

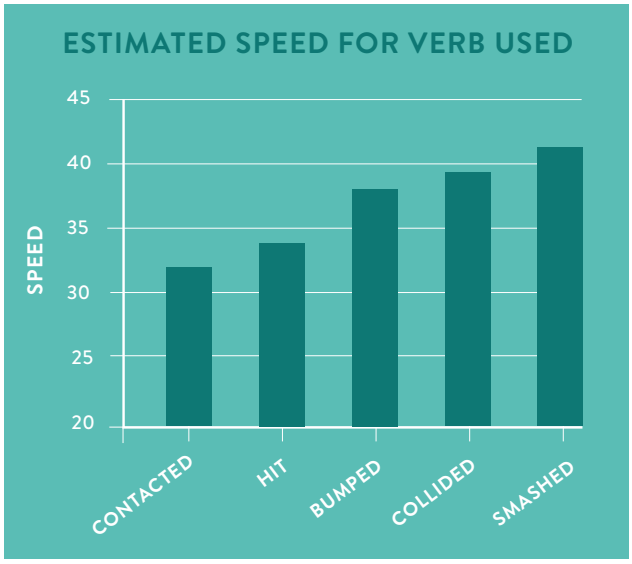


Figure 1.9.1: Estimated speed based on verb used, which shows the effect of Leading Questions in memory of an event.

HELPFUL ONLINE RESOURCES

Watch the video at this link to find out more about Loftus and Palmer's study and what it meant for the credibility of eyewitness testimony.
https://tinyurl.com/33627ccr

These findings led to the understanding that question formulation could in fact change how people recalled an event which has dangerous implications for police and witness interrogations. **Leading questions** are those which could manipulate a person's response. In the case of a police report, these could bias the recount by including assumptions related to the event. Police are now encouraged to use open questioning techniques that eliminate this bias and only use known facts. The term, 'leading the witness' also came from this idea that certain questions could encourage a desired response and might act to manipulate a recount of events for the benefit of an argument during court proceedings. This is also a problem when taking notes during an interview or event as the notetaker may change the meaning of the events by using their own wording as a record.

SCHEMA

In psychology the term schema refers to a framework of ideas in the mind made up of hierarchical mental categories that are related. It is proposed that people build up and refine these schemata (plural) over time so that multiple ideas may be recalled when a single retrieval cue is received. This is a process that is developed through experiences which help us to make sense of new information by accessing what is already known. If

you were to hear the sound of a car horn but could not see it because it is behind you, you would know it was a vehicle of some sort. Similarly, if you know you are going out to have dinner you would expect to see tables and chairs at the restaurant. Unfortunately, not all mental schemas are positive, for example negative experiences at primary school may have given you the expectation of a negative experience and cause you to dread moving into high school. In a study by Chase and Simon in 1973, chess players of different levels were shown a chess board with chess pieces placed in a particular formation for five seconds and were then asked to replicate this layout. Their findings showed that the more experience players had with playing chess, the easier it was for them to replicate the layout. They proposed that this was due to the mental schemata already built in the minds of the players so that several layers of the positioning could be chunked together making their STM use more efficient.

SELECTIVE ATTENTION

This refers to our ability to select which stimuli we will pay attention to and which we will not. It generally occurs at the sensory register stage of the modal model of memory but can also impact what information is passed from STM to LTM. Recent theories suggest that we have a limited amount of attention and that dividing this up depletes its effectiveness. This is why we cannot multitask well, but should instead concentrate on one task/incoming stimulus at a time and why interference might occur. Imagine you are typing an essay while listening to music with lyrics. At some point you might find yourself typing the lyric you just heard into your sentence. This occurs when your mind is unable to focus entirely on the task at hand due to competing thoughts.

CONFIRMATION BIAS

This is the tendency to search out information that supports our pre-existing beliefs while ignoring information that contradicts those beliefs. This can impact what we remember as we can subconsciously choose to retain or ignore information. In recent years with the rise of social media and uninformed content creators we have seen large divides on social issues such as the use of vaccines. People can now access multiple sources of information for almost any opinion held that can vary greatly in credibility.

SIMILARITY FACTORS

In general, stimuli that are similar in some way to previously learned information seem to be processed more quickly. This could be explained by the fact that the schema has already been created and is simply re-applied to incoming sensory inputs. In this way we would require less cognition to formulate a memory of the item. However, similarity can also affect retrieval negatively as we need to discriminate between the two memories, especially when they are acoustically encoded. Imagine meeting two people with a similar sounding name in a short space of time, let's say Maya and Mia. It is likely that you will have difficulty remembering which name is matched to each person when asked later to recall it.

1.10 IMPROVING RECONSTRUCTIVE MEMORY

The accuracy of eyewitness testimony could be addressed in a number of ways.

Learning Objectives:

- Explain the value of the person conducting a line-up or photospread being 'blind' to which member of the line-up or photospread is the suspect.
- Explain why the suspect should not stand out in the line-up or photospread.
- Describe how cognitive interviews are used, and explain their value.

2023 Subject Outline | Stage 1

POSSIBLE TEACHING CONSIDERATION

Have a staff member or student at the school come into the classroom and perform certain pre-determined tasks seemingly unnoticed by the teacher. Interview the class later about the events. Try using leading questions that use inaccurate details. Discuss the accuracy of eyewitness accounts and to what extent these should be relied upon in the criminal justice system.

Eyewitness Identification Recommendations

Eyewitness testimonies are often considered to be persuasive, however, the question of accuracy of recall and thus validity, has led to many convictions being overturned, particularly where DNA evidence has been later provided. Investigations into the issue began in the 1990s, with the findings now giving standard guidelines for police line-up and photospread procedures.

1. DOUBLE-BLIND PROCEDURE

Using a **double-blind procedure** means that both the witness and administrator don't know who the suspect is.

If this is not used, the administrator may show subtle differences in their language or behaviour regarding the suspect giving emotional cues to the eyewitness that may subconsciously lead them to choose that person.

2. INSTRUCTION ABOUT CHOICE

The witness should be instructed that the suspect may or ***may not*** be present and that they do not need to choose a suspect from those people presented.

This acts to reduce the amount of incorrect identifications as the eyewitness might feel compelled to make a choice and may not be confident in that choice.

3. COMPOSITION OF THE LINE-UP

This needs to be made up of 'filler' people who match the description given by the witness so that the suspect does not stand out.

If the suspect is the only person in the line-up or photobook reflecting the described traits, the eyewitness will be influenced to choose them whether they are the suspect or not.

4. CONFIDENCE STATEMENTS

The eyewitness needs to be asked to give their level of confidence at the time they are making their choice.

By asking for a confidence level at this time, there is less chance of any following evidence or responses from those in the criminal justice system changing their confidence level.

5. FEEDBACK

The administrator should refrain from giving any feedback to the witness about their choice in order to not impact confidence levels.

The eyewitness may need to give further evidence and this might bias their responses.

FURTHER READING

Find out more about how South Australian Laws govern the influence of identification evidence in the Evidence Act 1929 found here: https://tinyurl.com/z8h5er9s

Cognitive interviews

Due to the evidence from Loftus and Palmer on leading questions, it is now recommended that formal interviews use a structured format following specific guidelines. These are called cognitive interviews and were created using psychological knowledge of how memory and retrieval cues work found by Geiselman et. al. in a 1985 study. The researchers conducted an experiment comparing the use of a cognitive interview to responses from a normal police interview and found a significant increase in correctly recalled facts in the cognitive interview group. The cognitive interview gives the following procedure.

1. MENTAL REINSTATEMENT OF CONTEXTS

This means asking the witness to mentally take themselves back to the time and scene of the event. This could include recalling their emotions, sounds, sights and other information before talking through the important events. The aim is to activate retrieval cues such as context and state dependent cues in order to increase recall.

2. REPORTING FROM DIFFERENT PERSPECTIVES

Witnesses are asked to describe the event as seen from another person's perspective. This aims to reduce any personal bias and give a more objective view of the situation.

3. DESCRIBING THE EVENT IN REVERSE ORDER

It was proposed that when describing an event in chronological order, people tend to use their own schemas to fill in information that may be open to bias. The reverse order technique was encouraged to reduce this effect. Other orders or starting points may also be used to provide opportunity for more details to be recovered.

4. DETAILED REPORTING

Interviewers are asked to question the witness for as much depth of detail as possible in case a detail that was previously thought to be unimportant was integral to the situation.

Cognitive interviews are increasingly used in police interviews but training and time are the largest barriers to their use.

Figure 1.10.1: A cognitive interview taking place.

HELPFUL ONLINE RESOURCES

Television show Criminal Minds Evolution has used former FBI member Jim Clemente to inform an episode using a cognitive interview. Watch the video here to see the process.
https://tinyurl.com/44eedyve

SCIENCE AS A HUMAN ENDEAVOUR: REAL WORLD APPLICATION

Although research psychologists have made these recommendations to police in the US, there was backlash against many of them for various logistical reasons. Smaller police departments said that it was sometimes difficult to find a member of staff who did not know the identity of the suspects. They also made the case that there was not always time to train new officers in the cognitive interview technique.

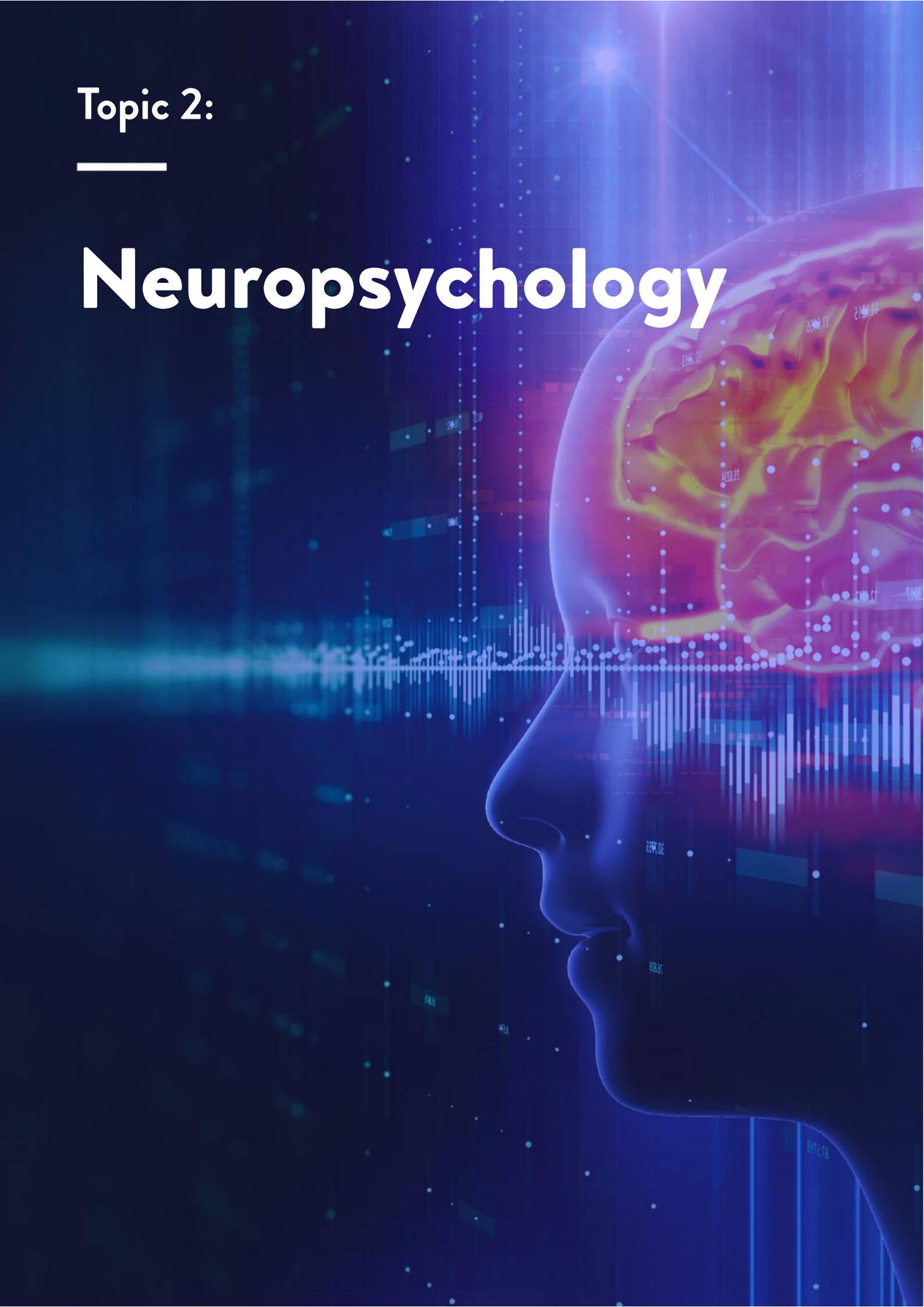
Despite strong findings in further studies that cognitive interviews provide much deeper and accurate recall of events, they will not always be carried out due to these constraints.

POSSIBLE TEACHING CONSIDERATION

Work in groups to create an instructional video for how to conduct either witness identification or a cognitive interview. Include the psychological reasoning behind each procedure point and discuss the research that led to each recommendation.

Topic 2:

Neuropsychology



2.1 THE NERVOUS SYSTEM

- Psychological and behavioural responses begin with stimulation to the nervous system.
- Discuss the different branches and roles of the nervous system (central, peripheral, somatic, autonomic, sympathetic, and parasympathetic).

2023 Subject Outline | Stage 1

Introduction to the nervous system

The nervous system is a complex structure of cells, tissues, and organs that processes stimuli and coordinates responses. Stimuli are received from both internal and external environments by receptor cells, which are triggered when change is detected. The nervous system must then determine how to organise the body to respond to the change. These changes may be visual, auditory, tactile, or cognitive. Our environment is constantly changing, and our body adapts accordingly.

The nervous system controls all thoughts, senses, feelings, and behaviours. Many of its functions occur unconsciously. You do not need to consciously control your heartbeat, your memory, or the size of your pupils when you go out into the sun. The nervous system recognises the need for increased blood flow, that learning is being undertaken, or that light cues have changed, and makes the necessary changes automatically. The changes we can control, such as how we choose to kick a football, are known as being under **conscious** control. The changes that occur automatically, such as an increase in sweating after being active, are under **unconscious** control.

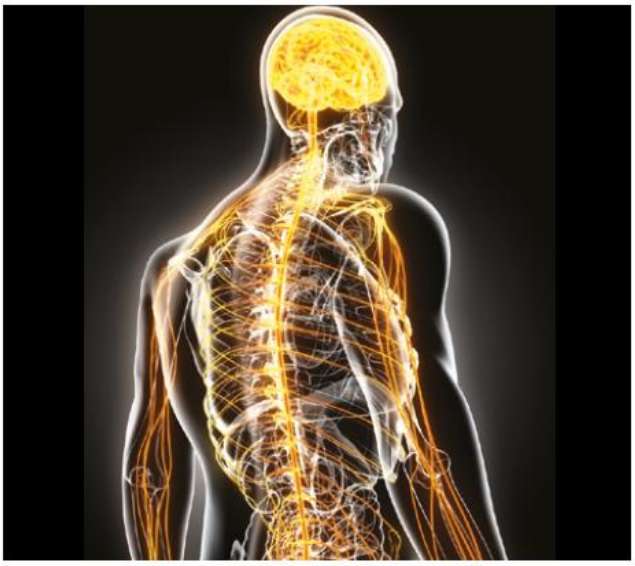


Figure 2.1.1: The Human Nervous System.

In this way, the network of specialised nerves that comprise the nervous system are used to detect change, determine an appropriate response, and coordinate the response utilising other systems within the body, such as the cardiovascular system, the endocrine system, and the musculoskeletal system. The three main functions of the nervous system are to

- **detect** change in the internal and external environment,
- **process** the information and
- **coordinate** a suitable response.

Sensation and perception

Sensation refers to how we detect changes in our environment through our five senses – sight, hearing, taste, smell, and touch. However, just the detection of stimuli alone does not mean that it is perceived. Our body detects millions of stimuli that we do not notice or recognise as important.

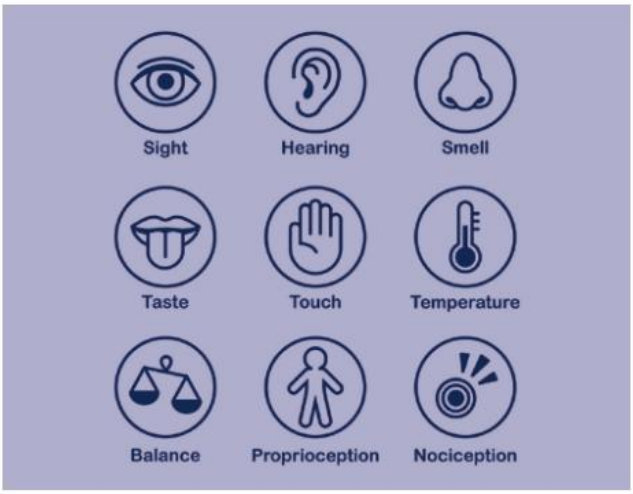


Figure 2.1.2: Types of Receptor Cells.

It is essential that the brain filters these stimuli so that the nervous system does not become overwhelmed.

Interpreting change in the internal and external environment is known as **perception**. It determines how we respond to the sensations and therefore how we interact with our environment. Perception is our sensory experience of the world.

INTRODUCTORY ACTIVITY

Give an example of a current change in your internal or external environment and how your nervous system is coordinating a suitable response.

.....

.....

.....

.....

DISCUSS

With a partner, determine a stimulus that you respond differently to, such as a food one of you likes and one of you dislikes. How have your past experiences shaped this response?

Interestingly, because perception is a cognitive interpretation, our past experiences and personality traits also influence the way stimuli is perceived. For example, seeing an airplane take off for the first time may be a source of excitement and wonder for a small child, but may barely be noticed by the experienced air-traffic controller. Similarly, a giraffe walking towards you may cause the perception of fear – but not so for the animal handler at the Adelaide Zoo who feeds the giraffe every day.

Figure 2.1.3: Perception is shaped by past experiences.

Memory also influences the way sensation is perceived. This is how you recognise the face of your friend in a crowd, yet don't respond to the strangers surrounding them.

Sensory cells

Sensory cells are specialised cells that detect stimuli related to change in the internal and external environment. They are located in many different regions of the body. Different types of sensory cells identify different stimuli.

For example, **olfactory receptors** detect smell, **photoreceptor cells** detect light, and **thermoreceptors** detect temperature.

Sensory cells also exist inside the body to monitor changes in the internal environment. These are called **interoceptors**. For example, there are specialised cells that detect changes in blood oxygen levels, pain, and the tingle on your tongue when you eat spicy food.

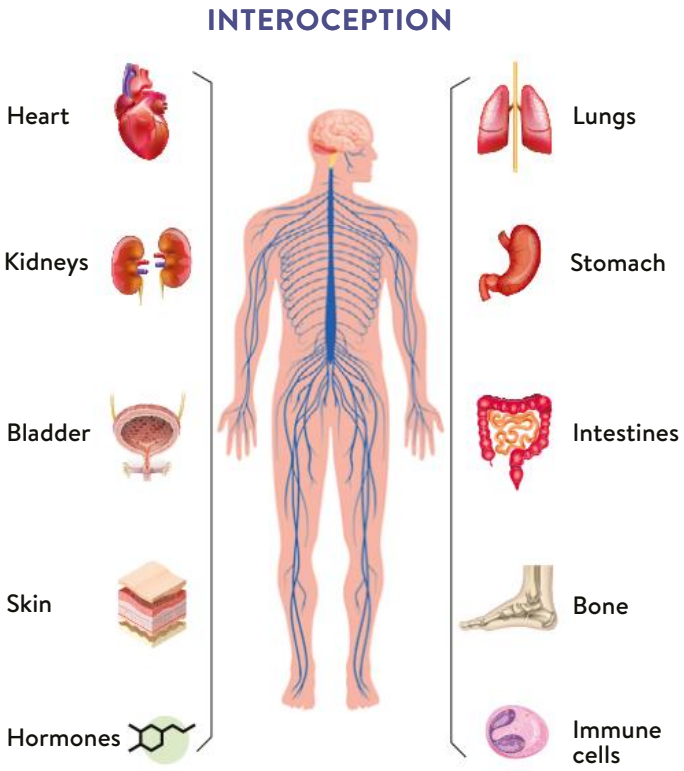


Figure 2.1.4: Interoceptors detect stimuli coming from the internal organs.

HELPFUL ONLINE RESOURCES

You can learn about the basics of the nervous system here:
https://tinyurl.com/mwzmxckn

Neurons

Cells comprising the nervous system are called neurons. They use a combination of chemical messengers and electrical signals to transmit information about the internal and external environment. Once the brain has processed this information and a suitable response is determined, neurons will ensure it is enacted by various other systems of the body. This may include the movement of muscles or the secretion of hormones. In this way, neurons are integral to the detection of stimuli and coordination of a response.

Sensory neurons are activated by input from the environment. They are also called **afferent nerves**. For example, when you pick a rose from the garden, your sensory neurons send information to the brain about how sweet it smells, or how the thorn on the stem hurt your finger. Specific areas of the brain that process scent and pain are activated and process the message received.

Motor neurons are the cells responsible for carrying messages away from the brain to the muscles, glands, and internal organs. They are also called **efferent nerves**. They are the longest cell in the human body.

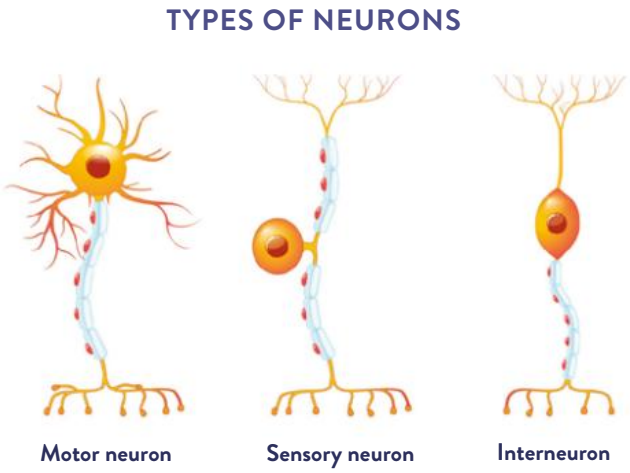


Figure 2.1.5: The Nervous System is comprised of three types of neurons.

Imagine your mobile phone rings. A range of sensory neurons are immediately activated. The cells in your ear detect the ring tone. The cells in your skin detect the vibration. When the screen lights up, sensory tissue in your eye is activated. These messages are all sent to the brain, which then processes them and determines an appropriate response. Motor neurons send messages to the muscles in your arm and fingers to press the 'answer' button and raise the phone to your ear. Motor neurons also activate the muscles in your vocal cords so that you can produce the speech necessary to greet your caller by saying 'hello'. In this way, the nervous system acts to coordinate complex, well timed and fluid responses to the stimuli presented.

Figure 2.1.6: Sensory neurons recognise the phone is ringing and motor neurons allow you to answer it.

The central nervous system

A body system this complex is best understood by considering the subsystems that comprise it. As shown in Figure 2.1.7, the Central Nervous System (CNS) is comprised of the brain and the spinal cord. The brain is one of the most complex organs in the human body. It is made up of more than 100 billion neurons that form trillions of connections with other neurons. The brainstem connects the brain to the spinal cord, which is a thick column of nerve tissue that runs from the base of the brain to the lower back.

CHECKING FOR UNDERSTANDING

Using the mobile phone example as a guide, brainstorm another scenario where the CNS processes stimuli and coordinates a response. Make sure you identify the actions of sensory and motor neurons!

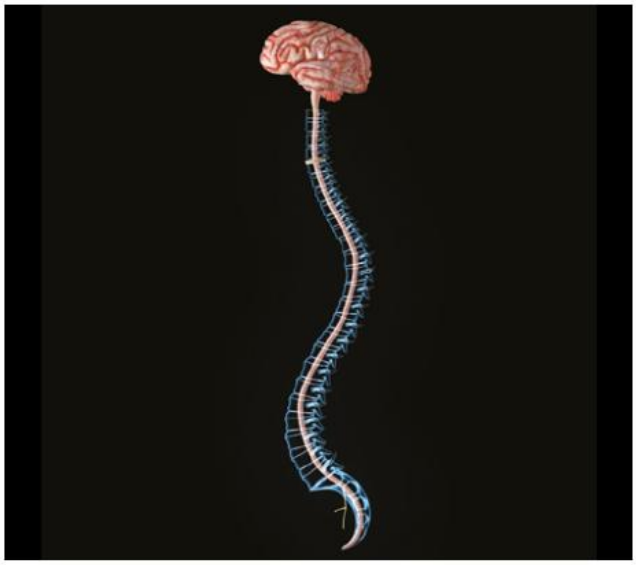


Figure 2.1.7: The Central Nervous System is comprised of the brain and spinal cord.

Because the spinal cord is a bundle of nerve fibres, it would be vulnerable to damage should it be exposed. Fortunately, it is well protected by the spinal column which is composed of a series of bones called vertebrae.

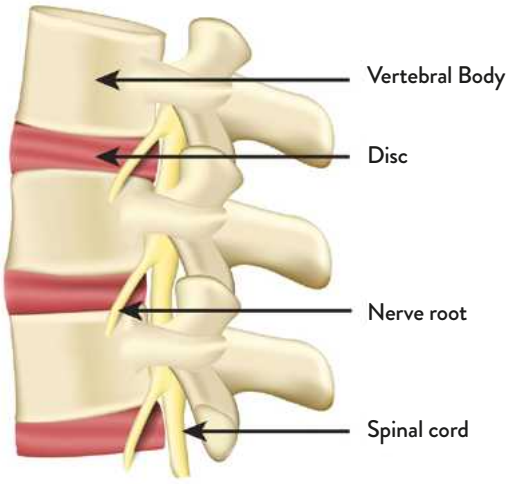


Figure 2.1.8: The spinal cord is well protected by the vertebrae.

The spinal cord has two major functions. It is the pathway along which neural messages are sent from the sensory neurons to the brain, to provide input about the internal or external environment. Like a highway, messages are also sent in the opposite direction. The spinal cord also allows messages to be sent from the brain to the rest of the body so that a response can be enacted. **Ascending** pathways carry sensory information to the brain, and **descending** pathways carry away from the brain.

Imagine that a capital city only had one major road that began in the centre of the CBD and went directly to the northern-most suburb. While commuters could access the locations at the beginning and end of the highway, they would not be able to visit any of the suburbs along the way. Similarly, if the body relied solely on the spinal cord as a neural pathway, messages from the brain would not reach the muscles, glands and organs that sit outside it.

Figure 2.1.9: If Main North Road was the only road that existed, we couldn't visit surrounding suburbs.

MOTOR NEURON DISEASE

Amyotrophic Lateral Sclerosis (ALS) is a progressive neurodegenerative disease that weakens muscles and impacts physical function. It affects nerves in the brain and spinal cord, causing muscles to waste away.

ALS impacts motor neurons, the nerve cells responsible for coordinating movement, meaning that the brain has difficulty initiating and controlling the muscles. Eventually, ALS impacts the sufferer's ability to speak, eat, move, and breathe.

Another name for ALS is Lou Gehrig's Disease, named after an American professional baseballer who suffered from the disease in the 1930s. Gehrig retired from baseball in 1939 after the movement disorder impacted his performance on the field. He passed away at only 38 years of age.

ALS is the most common form of Motor Neuron Disease (MND). Symptoms vary significantly between sufferers but include difficulty walking due to weakness in the legs and ankles. Speech can be slurred, and patients may have trouble swallowing. Muscles including those in the arms, shoulders and tongue may twitch uncontrollably. Some sufferers also experience emotional and behavioural changes, including inappropriate laughing and crying.

Stephen Hawking, a well-known sufferer of motor neuron disease, was diagnosed when he was only 21 years of age. Despite his disorder, Hawking pursued a university education, receiving a doctorate in applied mathematics and theoretical physics at 24. Between 1979 and 2009 he was a professor at the University of Cambridge, and a well-renowned authority on cosmology and quantum mechanics.

Despite a life-expectancy of only two years in 1963, Hawking lived a full life before passing away in 2018, aged 76. In the 1960s, he began using a wheelchair and in 1986, when Hawking lost his ability to speak, he used a computer program called 'The Equaliser' to speak for him. Despite Hawking being British, the software had an American accent.

In recent times, the fight against MND in Australia has been spearheaded by Neale Daniher, former player for Essendon, and Melbourne Football Club coach. Daniher was diagnosed in 2013 and has been a prominent campaigner for MND research ever since.

Fight MND is a charity that raises money and awareness for the disease. Daniher is a co-founder and patron of the organisation, which coordinates major events and the sale of merchandise, including the iconic Fight MND beanie. The annual King's Birthday football match between Melbourne and Collingwood football clubs features 'The Big Freeze', where celebrities slide into a pool filled with ice and water. To date, over 50 million dollars have been raised through these initiatives.

HELPFUL ONLINE RESOURCES

You can watch Neale Daniher's story here: **https://tinyurl.com/2akujtkc**

The peripheral nervous system

The Peripheral Nervous System (PNS) refers to the network of nerves that extend from the spinal cord, innervating the entire body. The function of the PNS is to link the CNS to the extremities of the body. The nerves that comprise the PNS are called **peripheral nerves**. These nerves have two functions:

- to transmit messages from sensory neurons about the internal and external environment to the brain and
- to relay messages from the brain to the muscles, glands and organs so that a response can be enacted.

To use the previous analogy about the highway out of the CBD, the PNS would represent all the streets leading to the suburbs surrounding the main road. These streets allow us to access homes, schools and shopping centres that would otherwise be unreachable if the only route was a single highway.

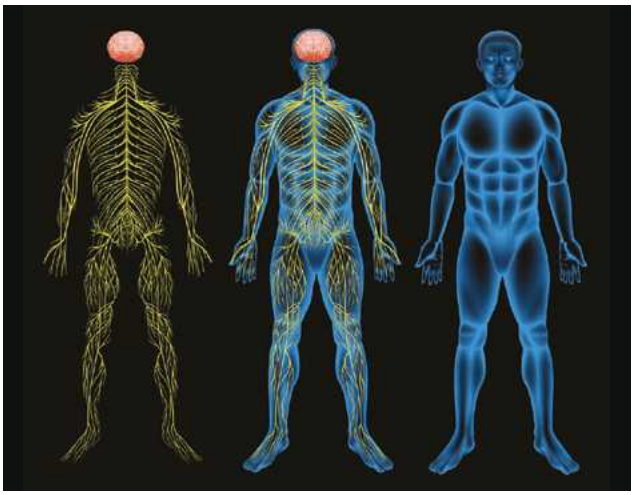


Figure 2.1.10: The Peripheral Nervous system refers to the nerves that branch off from the spinal cord and innervate all areas of the body.

The PNS allows neural messages to move beyond the spinal cord and reach muscles, glands and organs outside it.

As aforementioned, some of these messages are under voluntary control. We can choose when and how to use our skeletal muscles to move our body. However, other types of muscle, organs and glands operate involuntarily, without conscious thought.

The somatic nervous system

The somatic nervous system is a subdivision of the peripheral nervous system. It coordinates the skeletal muscles under voluntary control. Sensory receptors in the skin, muscles and tendons send information via neural pathways containing sensory neurons to the brain. The brain then determines the response necessary, which is sent via motor neurons back to the muscle fibres. By contracting and relaxing, muscle fibres can generate forces that allow the body to move. When the motor neuron attached to the muscle fibres is activated by a message from the brain, the muscle will respond by contracting. Different types of muscle fibres require varying levels of activation from the nervous system, allowing for 'fast twitch' muscle fibres to exert greater levels of force for movements that require greater muscular control. Whenever you choose how to move your body – when you drive a car, dance, play a sport or put on makeup – your somatic nervous system is active.

Imagine that you are playing a game of cricket. You are in the outfield when the batsman hits the ball. It's coming directly towards you – and a catch would win your team the game! Information about the speed and direction of the ball is detected by the sensory receptors in your eye and sent to your brain via sensory neurons. The brain determines just how your muscles should respond – how far your legs need to run to position yourself correctly, how your arms should be outstretched, and your hands cupped beneath the falling ball. These messages are sent via motor neurons to the muscles which move voluntarily – based upon your training and ability.

Figure 2.1.11: The somatic nervous system controls voluntary actions, like those needed when playing cricket.

However, the somatic nervous system doesn't control your breathing, your heart rate, and the movement of blood to your muscles. These changes are involuntary and controlled by the autonomic nervous system.

PLEGIA

Plegia refers to paralysis of the skeletal muscles, caused by damage to the nerves that control them. This damage can occur either in the brain, to the spinal cord, or to the peripheral nerves that surround the central nervous system.

Damage to the nervous system could be caused by stroke, traumatic brain injury, tumours, or disorders such as multiple sclerosis or muscular dystrophy. According to the National Spinal Cord Injury Statistical Center, since 2015, 38.3% of spinal injuries have been the result of a vehicle accident, and 31.6% have been from falls. Some other common causes include violent crimes and sporting accidents. The type of plegia suffered depends upon the location and severity of the damage to the nervous system. For example, severe damage to the spinal cord often results in para or quadriplegia.

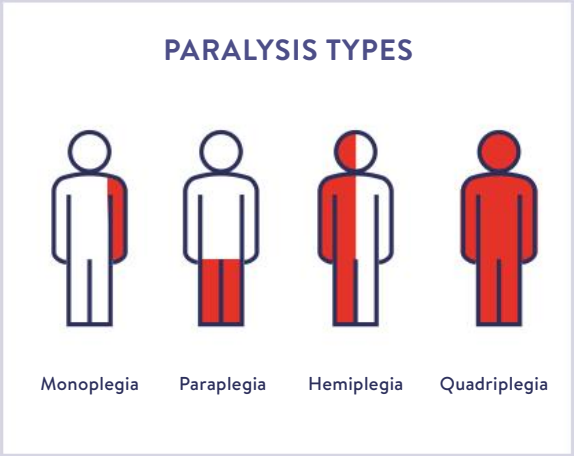


Figure 2.1.12: Different types of plegia affect different portions of the body.

Paraplegia refers to paralysis in the legs, with the arms still maintaining motor function. It is typically caused by injury to the spinal cord. Some sufferers of paraplegia may also experience paralysis in the lower portion of their abdomen. It can also cause sexual dysfunction, difficulties with bladder and bowel function and phantom pain in the paralysed area. While a complete recovery is unlikely, and most patients experience a permanent loss of movement, some will regain partial control. Sufferers of paraplegia often use wheelchairs and other mobility aides. Occupational therapy is also part of a treatment program, to allow the patient to maintain muscular tissue and range of motion.

Quadriplegia is a form of paralysis that affects all four limbs as well as the torso. Most sufferers are unable to move their body below the neck and require significant and ongoing care and support throughout their lives.

Quadriplegia is usually caused by damage high up in the spinal cord, above the level of the arms. The higher up the injury, the more of the body will be impacted by paralysis. In fact, many injuries that occur at the top of the spinal column are instantly fatal because of the impact they have on autonomic functions such as breathing.

The symptoms experienced by sufferers of quadriplegia are more severe than paraplegia patients. The paralysis impacts more of their body, which can lead to difficulty breathing and the inability to control urination and defecation. Depending on the location of the trauma to the spinal cord, some patients may require permanent breathing apparatus to assist with respiration.

Hemiplegia refers to paralysis that only affects one side of the body. Hemiplegia is often caused by strokes, aneurysms and blood clots in the brain. The opposite side of the body to the site of the damage is impacted. Hemiplegia can also be caused by concussion and other types of traumatic brain injuries, Bell's palsy or epilepsy. Hemiplegia is non-progressive, meaning that the symptoms do not worsen with time. It can affect the face only, or patients may experience complete paralysis in one side of the body.

It is important to note, that in all forms of plegia, there is no damage to the limbs themselves. The paralysis occurs because of the damage to the central nervous system, leaving the spinal cord unable to deliver messages to the muscles, or the brain unable to process messages from the muscles.

HELPFUL ONLINE RESOURCES

Watch Alex McKinnon's story on 60 Minutes. **https://tinyurl.com/2kvanekt**

Figure 2.1.13: Injuries at the top of the spinal column are more likely to result in quadriplegia. They are commonly fatal.

Autonomic nervous system

The autonomic nervous system is a subdivision of the peripheral nervous system. It controls organs, glands, and smooth muscle tissue, regulating functions such as heartrate, breathing, urination and sexual arousal. The autonomic nervous system also provides feedback to the brain about the activities of these systems. It is integral to the fight or flight response.

The term **autonomic** comes from the word **autonomous**, which means to 'control one's own affairs.' The autonomic nervous system is so called due to the lack of conscious control necessary for its function. In the cricket analogy above, you can concentrate on running, stretching and catching because you don't need to control the other changes occurring within your body – blood pressure, heartrate and sweating. These are unconsciously controlled by the autonomic nervous system.

In fact, regardless of your state of consciousness, the autonomic nervous system continues to operate, maintaining the systems needed to keep you alive. Even if you are in a coma or under anaesthetic during an operation, your heart keeps beating, your lungs keep breathing and your urine is being filtered by the renal system. Muscles under the control of the autonomic nervous system (such as cardiac muscle or the smooth muscle of the digestive system) have built-in mechanisms for maintaining their activity which do not rely on conscious control by the brain.

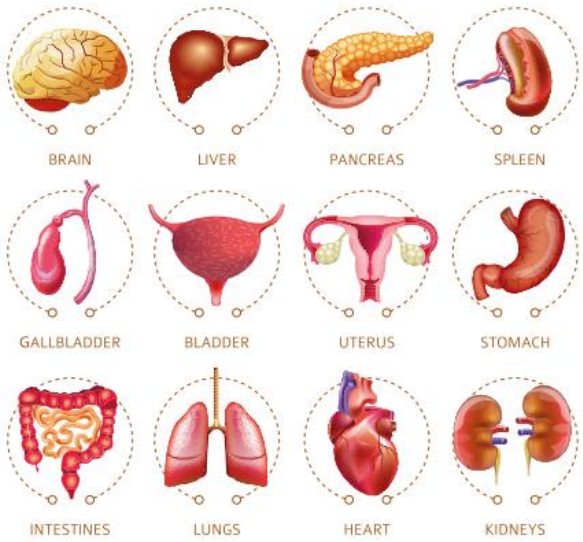


Figure 2.1.14: Muscles and glands under autonomic control.

Another difference between the somatic and autonomic nervous systems is that while the somatic nervous system activates the tissues it controls, the autonomic nervous system regulates the muscles, organs and glands under unconscious control. This means that, rather than initiating or inhibiting function, the autonomic nervous system increases or decreases existing function, in response to feedback received via sensory neurons.

Even though the autonomic nervous system operates involuntarily because it is partially controlled by the cerebral cortex in the brain, there are some elements of autonomic function that we can override with conscious thought.

For example, if you tried, you could alter the rhythm of your breathing. We often choose to do this when we sing – breathing in so that we can sing a long note and then purposely grabbing a breath of air in a logical break in the music. Scuba divers can learn to breathe using their diaphragm rather than their chest muscles, which allows for more efficient gas exchange and therefore longer periods of time under water. Meditation is often used to slow the heart rate and lower blood pressure.

Figure 2.1.15: Meditation is often used to slow heart rate and lower blood pressure.

Being aware of the changes caused by the autonomic nervous system, particularly in times of stress, can allow us to undertake techniques and practices that may help us remain calm, counteracting the heightened arousal levels of our body. Have you ever used a Fitbit to track your heart rate? Perhaps you have also used the built-in meditation app that allows you to slow it down, by focusing on your breathing. This is known as **biofeedback**. Biofeedback is the process of gaining an awareness of how the autonomic nervous system influences body function, usually through a device connected to the body, such as a smart watch or blood pressure cuff. Calming or meditative practices can then be used to manipulate these functions at will.

Figure 2.1.16: Fitbit watches offer biofeedback about breathing, heart rate and sleeping patterns.

HUMAN NERVOUS SYSTEM

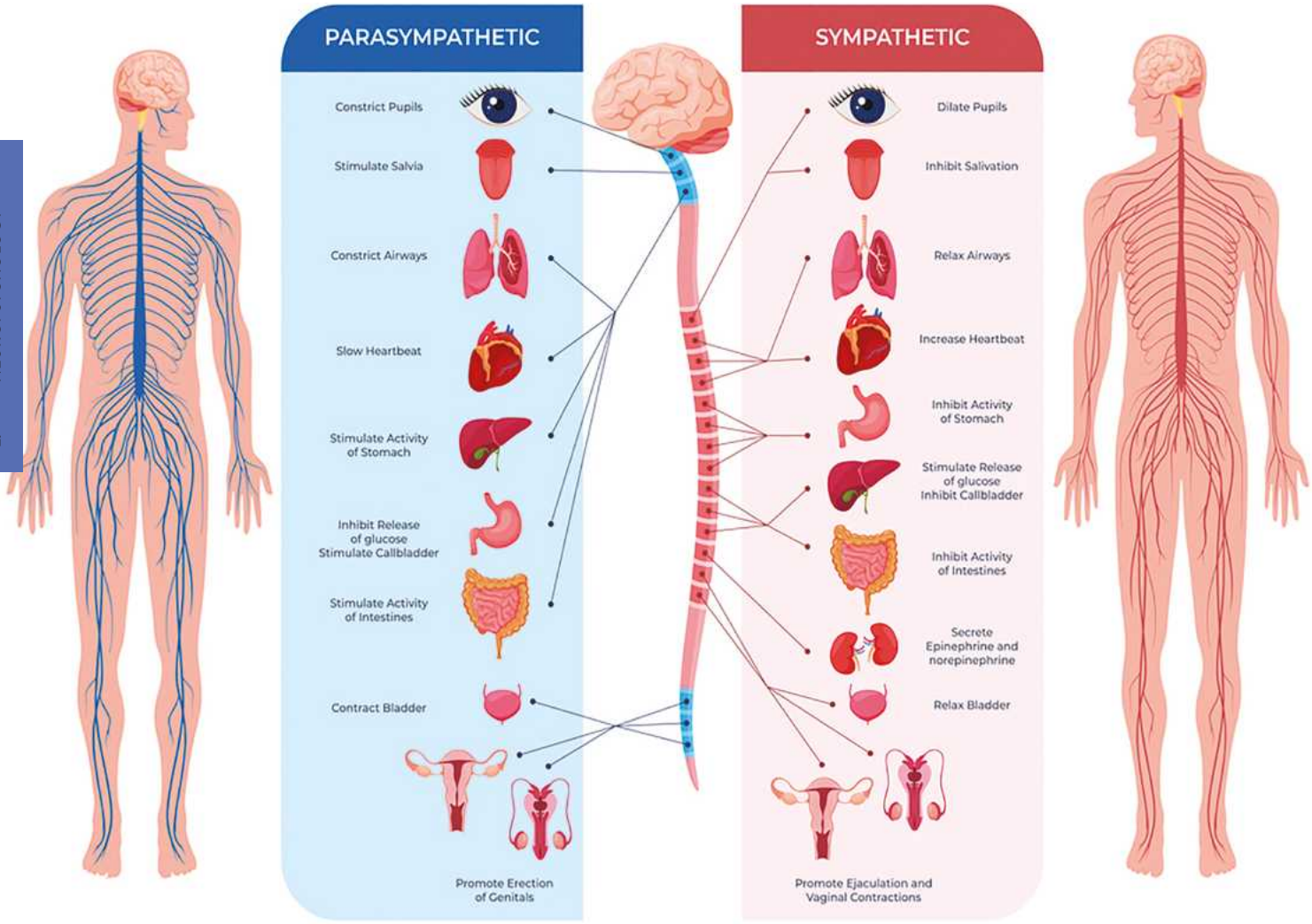


Figure 2.1.17: The Autonomic Nervous system is composed of two branches: The Sympathetic and Parasympathetic Nervous Systems.

The autonomic nervous system has two subdivisions: the sympathetic nervous system and the parasympathetic nervous system. While both divisions are active simultaneously, one is dominant at any given time. The sympathetic and parasympathetic nervous systems work together to control the many organs, muscles and glands under the regulation of the autonomic nervous system.

The sympathetic nervous system acts to increase levels of arousal in the body in response to the perception of threat. It also becomes dominant when experiencing shock, surprise, stress, or when undertaking vigorous physical activity.

The parasympathetic nervous system is dominant most of the time. It ensures that a steady internal state is maintained while the body is resting. The parasympathetic nervous system also counteracts the sympathetic nervous system when periods of stress, shock or fear are over. It coordinates a reduction in sympathetic activity to return the body to resting state.

The sympathetic nervous system acts upon the body more quickly than the parasympathetic nervous system does. When you consider the need for an immediate and efficient reaction to threat, it is essential that the sympathetic nervous system coordinates an instantaneous response.

The sympathetic nervous system

The sympathetic nervous system is a subdivision of the autonomic nervous system. It is responsible for preparing the body to deal with threat or a source of stress.

The nervous system uses both electrical signals and chemical messengers called neurotransmitters. One of the common neurotransmitters you have probably already heard of is adrenaline (or epinephrine). When the body is faced with a threat, adrenaline is secreted by the adrenal glands, increasing the activity of the heart, lungs, muscles and blood vessels. This is often called the **Fight or Flight Response**.

Imagine the caveman facing a hungry sabre-toothed tiger. His life is at risk, and he must immediately respond. He has two options – he can either run away as fast as his legs will carry him – or he can stay and fight for his life. Either option requires his body to perform at its peak, allowing him to respond quickly with increased levels of strength, awareness, and speed.

HELPFUL ONLINE RESOURCES

Listen to firefighters explain the fight or flight response.
https://tinyurl.com/2jzmxt73

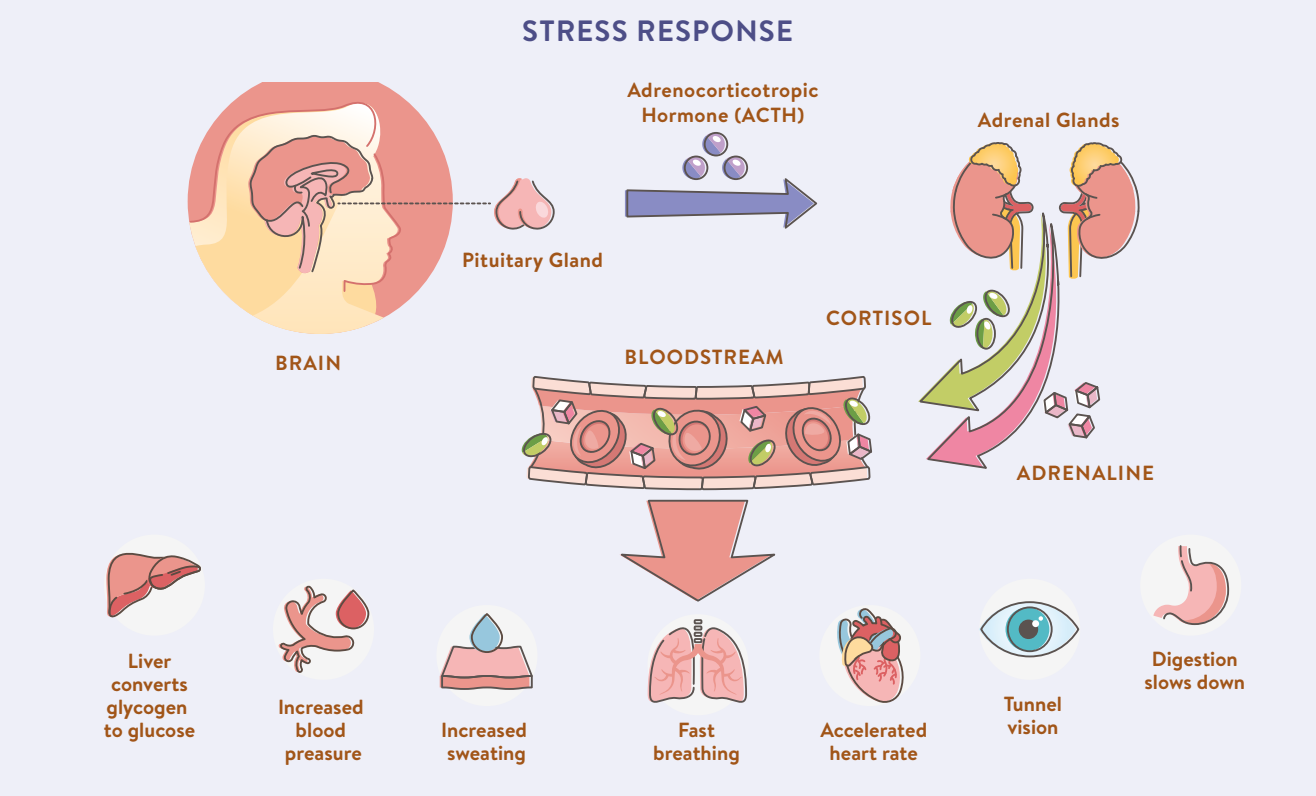


Figure 2.1.18: The Stress Response prepares the body to either 'Fight' or 'Flight'.

The fight or flight response is an automatic, physiological reaction to a threatening or frightening situation. It plays a critical role in survival. Adrenaline is secreted which not only acts as a neurotransmitter, assisting in the response of the sympathetic nervous system, but also as a hormone, that activates systems of the body necessary to either fight or flight.

Adrenaline, along with other hormones and neurotransmitters, acts upon many systems of the body, including the respiratory system, cardiovascular system and muscular system. These changes all occur to ready the body to respond to the threat it faces.

One of the most noticeable changes is an increase in heart rate. We often feel the thumping of our heart in our chest when we are nervous or scared. An increase in heart rate, and a subsequent increase in blood pressure, pushes oxygen-rich blood to the muscles. Energy stores in the liver are activated and glucose is released into the blood stream.

Oxygen is vital for the breakdown of glucose, providing muscles with the fuel they need to function. The bronchial tubes in the lungs widen to make breathing more efficient and respiration rate increases.

The sympathetic nervous system also acts upon the pupils, by dilating them to allow more light to enter the eye. This improves vision and provides the brain with important information regarding one's surroundings. It also causes an increase in sweating in an attempt to cool the body.

In times of threat or fear, the skin may become either flushed or pale. This is because blood flow is redirected to the most vital areas of the body: primarily the muscles and the brain. The blood also clots more readily when the sympathetic nervous system is dominant. This readies the body to deal with possible wounds or blood loss caused by the threat it's facing.

The fight or flight response also causes muscles to contract, preparing them for action. This may also cause trembling, or goosebumps to appear on the skin.

Contrastingly, sympathetic nerves cause a relaxation and expansion in the muscles that control the bladder, which can lead to a loss of control and involuntary urination.

When dominant, the sympathetic nervous system ensures that body functions that are essential for survival are prioritised over those that are not. For example, the digestive system is slowed when we are experiencing fight or flight. This occurs so that blood can be redirected to muscles and organs that require it more urgently.

The sympathetic nervous system also acts upon our cognitive functions. The additional oxygen being sent to the brain increases levels of alertness, focus and problem-solving abilities.

While the physiological and psychological changes outlined above are many and complex, they are implemented by the sympathetic nervous system almost instantaneously when a threat is encountered. In fact, the fight or flight response begins readying the body for action even before the sensory information sent to the brain about the external environment has been completely processed.

When considering our caveman faced with the sabre-toothed tiger, the changes implemented by the sympathetic nervous system have prepared his body and brain to either stay and fight or run away. Whichever option he chooses, within minutes he will either be safe, or dead. The fight or flight response is a burst of energy and physiological change that is only designed to be short-lived, allowing us to deal with threat with focus, strength and speed.

The parasympathetic nervous system

The parasympathetic nervous system is dominant most of the time, when there is no apparent threat, and the body is in a resting state. Just as sympathetic control is referred to by the term 'fight or flight', parasympathetic control can be referred to as 'rest and digest'.

When the parasympathetic nervous system is controlling the body, glands, tissues and organs function to maintain homeostasis. Homeostasis refers to a steady, internal state. The parasympathetic nervous system balances all body systems to sustain operation within strict parameters, maintaining integral survival functions such as body temperature, blood sugar levels and breathing rate.

'Rest and Digest' describes the reduced activity in body systems when under parasympathetic control. The parasympathetic nervous system counterbalances the sympathetic nervous system by returning the body to resting state after the threat has passed.

HELPFUL ONLINE RESOURCES

Try maintaining homeostasis in this interactive activity!
https://tinyurl.com/38f8m6b7

The heart rate, breathing rate and blood pressure return to normal. Glucose is once again stored by the body, rather than being instantly metabolised. Adrenaline is no longer secreted, sweating ceases and both pupils in the eye and bronchi in the lungs constrict. Muscles now relax and blood flow to all areas of the body resumes. In a resting state, the digestive system can also resume function.

The parasympathetic nervous system does not act upon the body as rapidly as the sympathetic nervous system does. When considering their respective functions, this makes sense. The sympathetic nervous system must act instantaneously to ensure the body is ready to deal with threat as soon as it is perceived.

However, the adrenaline released during the fight or flight response takes time to be metabolised out of the bloodstream. In fact, the sympathetic nervous system continues to dominate the body for up to an hour after the threat has passed. This also allows the body to stay on alert in case the threat returns. The parasympathetic nervous system takes time to regain dominance, and during the interim, the body may continue to function at a higher level of arousal, even though the initial source of fear or stress has passed. For example, a near-miss victim may continue shaking uncontrollably, due to the effect of adrenaline on the muscles.

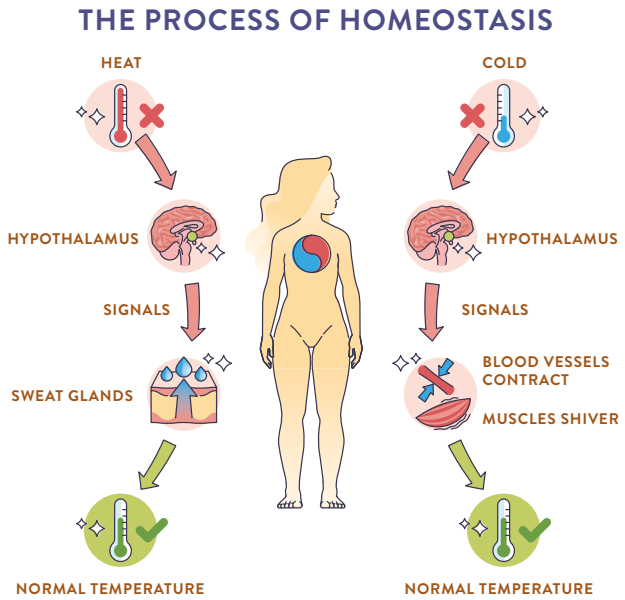


Figure 2.1.19: Maintaining a steady body temperature is an example of homeostasis.

CHECKING FOR UNDERSTANDING

Imagine you're driving along the North-South Motorway. Suddenly, you see a car heading directly towards you – driving in the wrong direction! You quickly check your blind spot and change lanes, barely missing the oncoming car. As soon as you can, you pull over so you can catch your breath. Your heart is beating wildly, and you feel sweaty.

1. **Use the table below to record the changes that happened in your body due caused by the Autonomic Nervous System.**

BODY PART / FUNCTION	SYMPATHETIC RESPONSE (WHEN FACING THE ONCOMING VEHICLE)	PARASYMPATHETIC RESPONSE
Heart Rate		
Blood Pressure		
Breathing Rate		
Adrenal Glands		
Pupils		
Digestion		
Sweat Glands		
Bladder		

2. **Identify the sensory input detected by your nervous system in the above scenario.**

3. **Identify the motor responses coordinated by your nervous system once the sensory input was processed.**

4. **Car accidents often cause significant injuries. Describe what may occur if someone suffered an injury to the spinal cord just below the neck.**

5. **Identify the following behaviours as being controlled by the somatic nervous system, the autonomic nervous system or both.**
   a) Riding a surfboard on a 10-foot wave
   b) Sweating before having to make a class presentation
   c) Turning the pages of a book
   d) Experiencing a dry mouth when called to the principal's office
   e) Ducking when a stray tennis ball comes towards you

THE STRESS RESPONSE IN ANIMALS

Humans are not the only organism that benefit from a stress response. Many animals experience a similar 'fight or flight response' when faced with a predator, when attempting to assert their dominance over another member of the pack or when placed in a dangerous situation. Painful aging conditions such as arthritis and a lack of mobility can also heighten stress levels in animals. You have probably witnessed the fight or flight response in a domestic pet, such as a cat or a dog.

When a dog is faced with another dog, and perceives it as a threat, the sympathetic nervous system is activated in much the same way as it is in humans. Adrenaline is secreted, blood pressure and heart rate increase, breathing becomes rapid and shallow, pupils dilate, and digestion slows. You may notice the hairs that line their backbone (hackles) become erect, caused by the contraction of muscles in preparation for fight or flight. Depending on temperament, and past experiences, a dog may run away, with its tail between its legs or it may bare its teeth, bark and attempt to fight. As a responsible dog owner, recognising these physical changes in your pet and avoiding situations that cause them stress, such as not taking them to a dog park when they react poorly to the presence of other dogs, is important.

While vertebrates (animals with backbones) experience a stress response initiated by the release of adrenaline, invertebrates such as spiders, crabs and insects have different nervous systems which utilise a hormone similar to adrenaline, called octopamine. Octopamine (named due to its discovery in the salivary glands of octopus) has been the focus of numerous studies in a range of organisms and has been found to increase limb extension abilities in the crayfish, increase muscle tension in the hind legs of locusts and leads to light production in the firefly.

The Jewel Wasp has developed a chemical cocktail that, when injected into the brain of a cockroach, blocks the normal function of octopamine, rendering the insect powerless to fight or flight. While the cockroach maintains the ability to move, there is no perception of threat and no response enacted by the sympathetic nervous system, even as the cockroach is being dragged to its death by the wasp.

Figure 2.1.20: Raised hackles on the back of this coyote are caused by tense muscles, preparing the animal to fight or flight.

HELPFUL ONLINE RESOURCES

Watch this Jewel Wasp paralyse a cockroach.
https://tinyurl.com/mr3a8r38

The reflex response

In addition to regulating the voluntary movements of the body, the somatic nervous system also coordinates **reflex responses**. These responses are simple actions initiated by the spinal cord, independent from the brain. It allows the body to react quickly, but the response is not as well coordinated.

A reflex response (also known as a spinal reflex) is an involuntary reaction to stimuli that occurs almost instantaneously.

A classic example is a doctor performing a nervous system check on a patient by tapping on their kneecap with a little rubber hammer. When he hits just the right spot, the tendon in the knee is stretched, which activates the muscle in the thigh attached to it. A message is then sent to the spinal cord which instantaneously instructs the thigh muscle to contract. This causes the patient's leg to kick out – hopefully not harming the doctor!

Figure 2.1.21: A check of the nervous system is conducted by tapping a tendon in the knee with a small rubber hammer.

The response is fast – but because it is involuntary, it is not well coordinated. Usually, you have control over your skeletal muscles – you could choose to kick your leg right now if you wanted to! If you did, you could control the speed, the direction, the position of your leg in space, and how much force you choose to use. The spinal cord doesn't have the ability to control all of these factors. It is used to enact a fast response, rather than a well-executed one.

You may wonder why an immediate response is needed in this situation. Outside of the doctor's office, the muscle that was activated with the hammer is used to control your balance. If a force acts on your kneecap while you are standing upright, it could cause you to fall. The spinal cord's control of the tendon and muscle in your thigh counteracts the force, allowing you to remain upright.

The reflex response is often referred to as a **reflex arc**. A reflex arc is a neural pathway that performs a reflex response. In the simplest example, a single sensory neuron connected to the spinal cord activates a single motor neuron to enact a response on a muscle. The term 'arc' is used because the action of the sensory neuron is immediately mirrored by the motor neuron, in a rapid and spontaneous response directed by the spinal cord. The brain is not immediately engaged in this process – the sensation of the stimuli is not perceived by the brain until after the response has occurred.

Imagine you are in the kitchen, where you know your father has been cooking breakfast on the stove. You accidentally lean your arm against the hot plate he was using. The sensory neurons in your arm immediately send an urgent message to the spinal cord which coordinates the muscles needed to jerk your arm away.

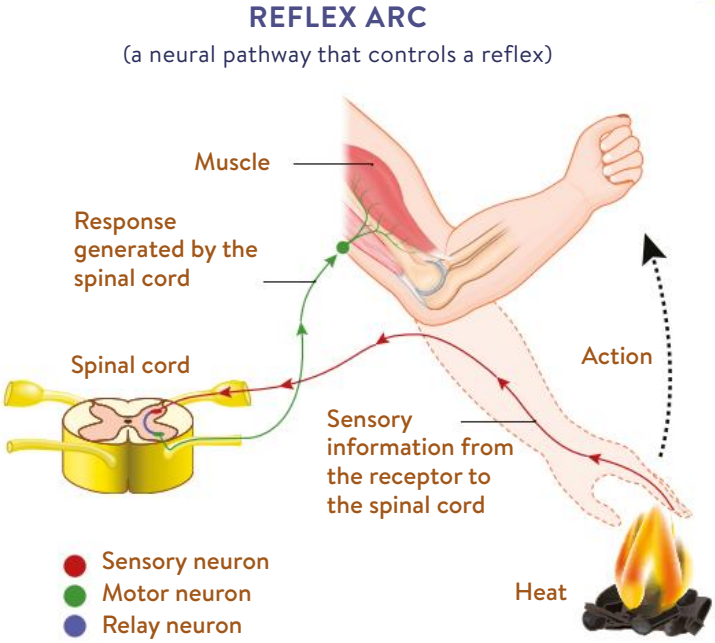


Figure 2.1.22: The reflex arc.

It is only a moment later that you experience the full perception of pain.

This example of a reflex response demonstrates how important it is that the body has an instantaneous mechanism to remove itself from harm. If the response needed to be coordinated by the brain, it would have taken longer, and the damage caused to the arm could have been more severe. In this way, the reflex response, coordinated by the spinal cord, allows the body to save time by rapidly enacting a response that minimises harm or even ensures survival.

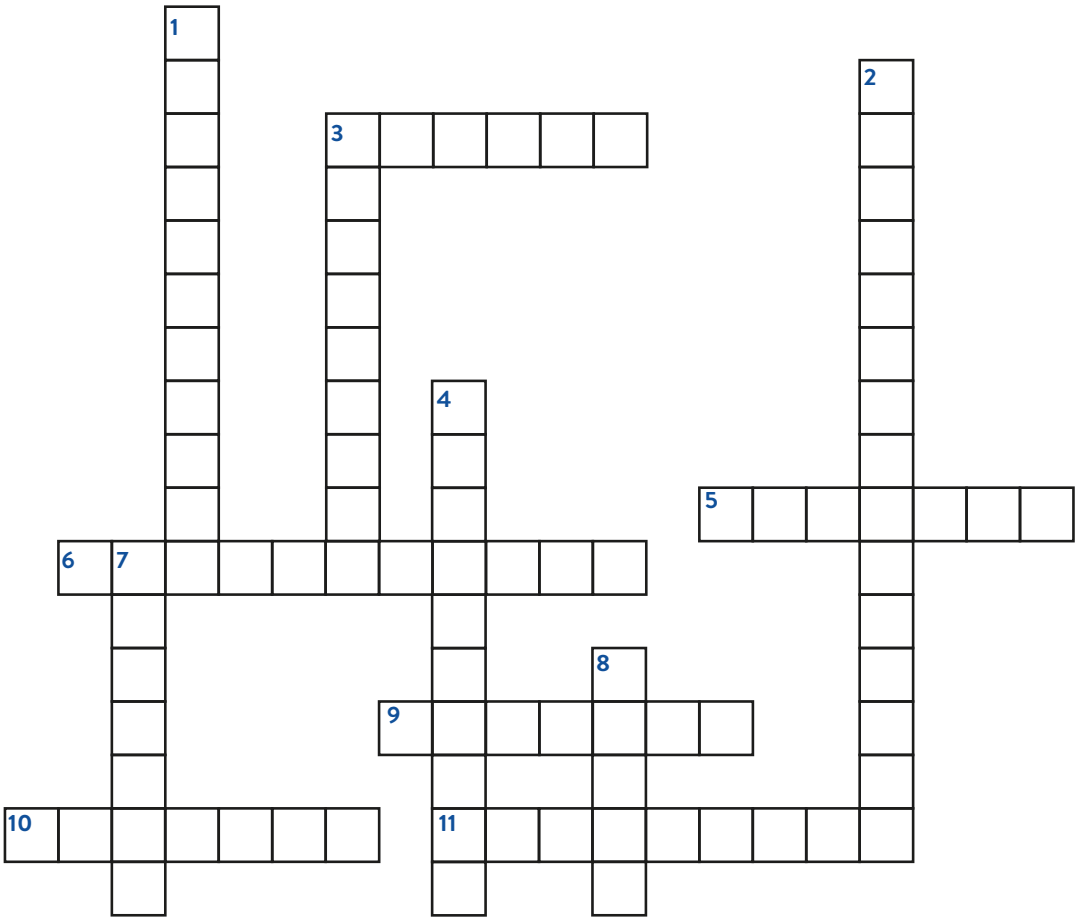
A reflex response does not mean that the brain is not involved at all. Often secondary responses occur when the sensory information is processed and perceived by the brain, resulting in voluntary, well-coordinated movement.

CHECKING FOR UNDERSTANDING

For each of the statements below, select TRUE or FALSE.

	TRUE	FALSE
Receptor cells detect changes in the environment.		
Heartrate is under conscious control.		
Digestion is under unconscious control.		
Thermoreceptors are a type of sensory cell.		
Memory influences the way sensation is perceived.		
Motor neurons send information to the brain.		
The spinal cord is made up of peripheral nerves.		
The peripheral nervous system surrounds the spinal cord.		
The somatic nervous system controls voluntary actions.		
The sympathetic branch is dominant during rest.		
Heart rate increases during the Fight or Flight response.		
The sympathetic branch works faster than the parasympathetic.		

1.



DOWN

1. Branch of the nervous system that prepares the body to deal with the threat
2. Branch of the nervous system that allows us to "rest and digest"
3. Cells that detect changes in the environment
4. Branch of the nervous system ouside of the spinal cord
7. Nerve cells
8. Type of neuron that send information to the muscles

ACROSS

3. A fast response initiated by the spinal cord
5. Branch of the nervous system that controls voluntary movement
6. Functions that occur without conscious thought
9. Type of neurons that send information to the brain
10. Name of the nervous system composed of the brain and spinal cord
11. Branch of the nervous system that controls involuntary actions

2. Fill in the missing terms:

The Central Nervous System is composed of the _____ and the _____ _____ while the _____ Nervous System is all other nerves.

The _____ Nervous System controls all voluntary muscle movement, while the _____ Nervous System controls all _____ actions.

The _____ or _____ response is controlled by the _____ Nervous System. The _____ Nervous System works to calm the body down after danger has passed.

3. Name two functions that INCREASE when the Parasympathetic Nervous System is dominant, and two functions that DECREASE.

Increase: _____ and _____

Decrease: _____ and _____

4. In the image shown, the man's brain did not tell him to kick his doctor in the face. What has occurred here?

"That's a pretty powerful reflex you got there."

CHECKING FOR UNDERSTANDING

1. Your brain controls
a. Your breathing, to maintain the right amount of oxygen in your blood stream.
b. The activity of the endocrine system, which stimulates the release of hormones.
c. How you think, how you feel and what you do.
d. All of the above

2. The Central Nervous System consists of which two components?
a. The brain and the spinal cord.
b. The brain and the sensory neurons.
c. The sensory neurons and the motor neurons.
d. The spinal cord and the motor neurons.

3. A spinal reflex elicits a very fast response because
a. The brain works faster in emergency situations.
b. The message takes a short cut to the spinal cord which determines the response necessary.
c. It is a learned response.
d. The nerves in the spinal cord are more efficient than the nerves in the brain.

4. The _____ provides a link between the brain and the other parts of the body.
a. Skull
b. Spinal Cord
c. Spinal Reflex
d. Backbone

5. Three things your autonomic nervous system controls are:
a. Kicking a football, heartrate and digestion.
b. Intelligence levels, emotions and sleep patterns.
c. Playing an instrument, reading a book and coughing.
d. Digestion, breathing and perspiration.

6. As you walk down the street a vicious dog suddenly appears and chases you, barking and growling. Which of the following systems is least likely to be active in your attempt to flee from the dog?
a. Endocrine system which stimulates the adrenal gland to produce adrenalin.
b. Circulatory System.
c. Sympathetic Nervous System.
d. Parasympathetic Nervous System.

7. _____neurons detect specific neural messages and transmit them to the brain, whereas _____neurons send messages from the brain to the muscles, glands and organs.
a. Motor; Sensory
b. Sensory: Motor
c. Sensory; Sensory
d. Motor; Motor

8. There are many neurons that branch off from the spinal cord to other parts of the body. This is called the
a. Central Nervous System.
b. Peripheral Nervous System.
c. Autonomic Nervous System.
d. Somatic Nervous System.

9. The branch of the Nervous System that controls voluntary muscle movement is called the
a. Peripheral Nervous System.
b. Central Nervous System.
c. Autonomic Nervous System.
d. Somatic Nervous System.

10. Which disorder can describe the result of a debilitating injury to the spinal cord below the arms?
a. Hemiplegia.
b. Quadriplegia.
c. Paraplegia.
d. Cerebral Palsy.

11. The response the body engages in when faced with a threat is known as
a. The Escape or Battle Response.
b. The Run or Roar Response.
c. The Fight or Flight Response.
d. The Sprint or Skirmish Response.

12. The body likes to maintain a steady internal state. The scientific name for this is
a. Equilibrium.
b. Homeostasis.
c. Balance.
d. Internal Stability.

Parkinson's Disease is a brain disorder that causes difficulties with balance and coordination as well as uncontrolled, shaky movements. Additional symptoms include behavioural differences, mental health issues such as depression and anxiety, fatigue and difficulties with memory. While there is currently no cure, medication can significantly improve symptoms and quality of life for patients.

Parkinson's Disease is caused when neurons in the brain that secrete the neurotransmitter dopamine die, thus reducing the amount of dopamine available for use in neural pathways. This leads to a loss of control of body movement in patients.

Another important neurotransmitter is noradrenaline. It is used in the neural messaging of sympathetic neurons in the fight or flight response. In Parkinson's sufferers, nerve endings that produce noradrenaline are damaged, which leads to reduced levels of the neurotransmitter. This contributes to symptoms such as digestive difficulties, fatigue and low blood pressure.

HELPFUL ONLINE RESOURCES

Watch this clip about Parkinson's Disease from the Michael J. Fox Foundation.
https://tinyurl.com/yuwtceuj

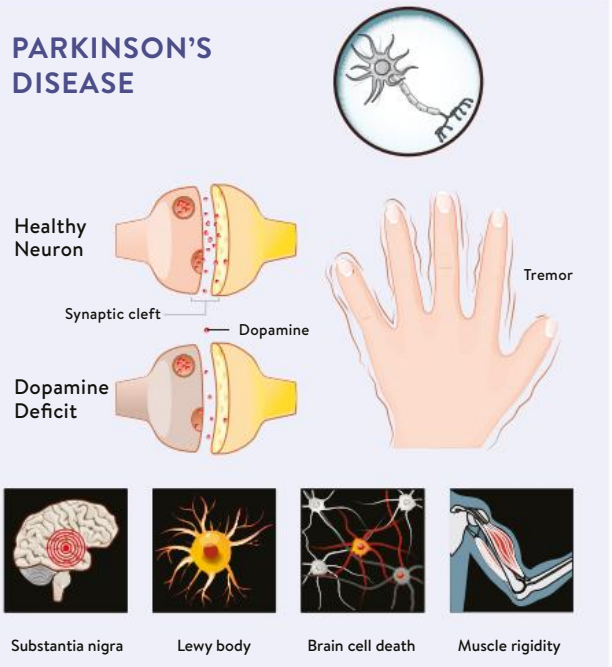


Figure 2.1.23: Sufferers of Parkinson's Disease lack dopamine which causes muscle rigidity and tremors.

SCIENCE AS A HUMAN ENDEAVOUR

The following article was published in Science Daily on 6 October 2022.

VOICE SCREENING APP DELIVERS RAPID RESULTS FOR PARKINSON'S AND SEVERE COVID.

A new screening test app could help advance the early detection of Parkinson's disease and severe COVID-19, improving the management of these illnesses.

Developed by a research team of engineers and neurologists led by RMIT University in Melbourne, the test can produce accurate results using just people's voice recordings.

Millions of people worldwide have Parkinson's, which is a degenerative brain condition that can be challenging to diagnose as symptoms vary among people. Common symptoms include slow movement, tremor, rigidity and imbalance.

Currently, Parkinson's is diagnosed through an evaluation by a neurologist that can take up to 90 minutes.

Powered by artificial intelligence, the smartphone app records a person's voice and takes just 10 seconds to reveal whether they may have Parkinson's disease and should be referred to a neurologist.

Lead researcher Professor Dinesh Kumar, from RMIT's School of Engineering, said the easy-to-use screening test made it ideal to use in a national screening program.

He said the team had developed a similar test for people with COVID-19 to reveal whether they need clinical attention, including hospitalisation.

"Early detection, diagnosis and treatment could help manage these illnesses, and so making screening faster and more accessible is critical," Kumar said.

"This research will allow a non-contact, easy-to-use and low-cost test that can be performed routinely anywhere in the world, where the clinicians can monitor their patients remotely.

"It could also promote a community-wide screening program, reaching people who might not otherwise seek treatment until it's too late."

DISCUSS

After reading the excerpt above, discuss the evidence for the SHE concepts:

- **Communication and Collaboration**
- **Influence**
- **Development and Application**

2.2 NEURONS

- The nervous system is comprised of specialised cells.
- Discuss different types of neurons (motor, sensory, and interneurons) and their roles in contributing to psychological responses.

2023 Subject Outline | Stage 1

The neuron

As previously discussed, the ability of the brain to interpret information provided by sensory neurons and execute a response via motor neurons is dependent on an intricate and complex network of nerve cells throughout the body.

In fact, there are approximately 86 million neurons that comprise our nervous system, working in synergy to ensure that stimuli are detected, processed, and responded to.

Neurons also rely on another type of cell, called **glia**. **Glial cells** provide functional and structural support to neurons, allowing them to function efficiently. Glia hold neurons in place and supply them with nutrients and oxygen. They also destroy pathogens and insulate neurons from one another, to ensure the electrical signalling process works effectively.

Neurons are the cells comprising the nervous system that use both electrical and chemical processes to deliver messages to and from the brain. Along with the brain, they are responsible for everything we think, feel and do.

There are three types of neurons. **Sensory neurons** detect information from the internal and external environment and transmit these messages to the brain. **Motor neurons** carry messages away from the brain to the muscles, glands, and organs. **Interneurons** connect sensory neurons to motor neurons.

Neurons are the longest cell in the human body. When you consider the sheer size of a human in comparison to the cells they're composed of, it's important that neurons have a structure that supports their function – delivering neural messages around the body.

Like most cells, neurons have a cell body containing the nucleus and mitochondria needed to provide the cell with energy. Another name for the cell body in a neuron is the soma. The soma is surrounded by a membrane and maintains the neuron's structure.

Branching out from the cell body are protrusions called dendrites. Dendrites split further into protrusions called dendritic spines which feature a bulbous head connected to the dendrite by a thin tail. These spines improve the surface area available to detect neural messages, allowing for increased contact with other neurons. Dendrites allow neurons to receive more than one signal at a time. When information is detected by the dendrites, it is transmitted to the cell body for processing. Amazingly, neurons can replace damaged dendrites, demonstrating neuroplasticity.

The **axon** is a long, thin structure leading away from the cell body. This is the structure that gives the neuron its

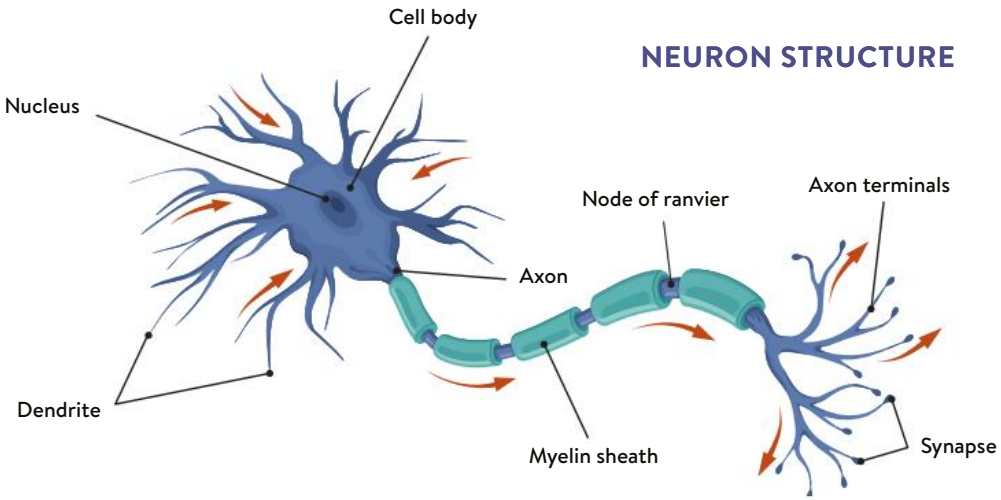


Figure 2.2.1: The structure of a neuron.

length. Some neurons that comprise the spinal cord have axons that are over a metre long. The axon's function is to transmit the electrical signals initiated by the cell body to other neurons.

The axon is coated with a thick, fatty substance called **myelin**. Myelin forms an insulating sheath around the axon to ensure the electrical signal is transmitted efficiently. If the myelin sheath is damaged, these messages slow down. You can imagine myelin as the plastic coating around a power cord – allowing electricity to flow over long distances without loss or interruption. The myelin sheath occurs in segments along the length of the axon, with small gaps in between, called the **nodes of Ranvier**, which ensure efficient transmission of nerve impulses along the axon.

At the end of the axon are knoblike structures called axon terminals. This structure contains neurotransmitters, the chemicals needed to continue the transmission of a neural signal across the small gap between neurons. Each neuron has one axon, but many axon terminals, allowing for the simultaneous transmission of many messages to other neurons.

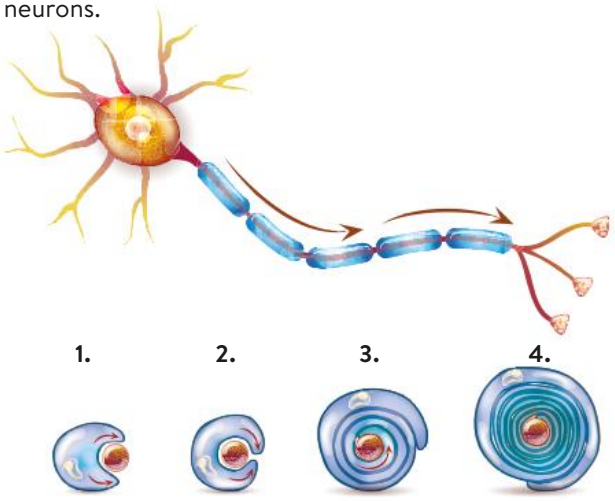


Figure 2.2.2: Myelin forms an insulative coating around the axon.

HELPFUL ONLINE RESOURCES

Watch this video explaining the structure and function of a neuron.
https://tinyurl.com/2n7mvsfb

Build and label your own neuron in this fun interactive activity!
https://tinyurl.com/4z6wpmav

DISCUSS

With a partner, discuss how each part of the neuron is designed to suit its function.

Chemical Messaging

An action potential is the scientific term for the electrical impulse sent along the axon of a neuron. A neuron is at rest when it is not transmitting an action potential. However, when the dendrites detect a message from the previous neuron, the cell body determines whether the transmission should continue. If so, it initiates an action potential which moves down the axon, insulated by the myelin sheath.

When the electrical impulse reaches the axon terminals, it is unable to cross the microscopic gap separating the current neuron from the next. Although the axon terminals are within very close proximity to the dendrites on adjacent neurons, electricity cannot move across the space between them.

The gap between neurons is called the **synapse**. It is a junction between the axon terminals of the pre-synaptic neuron and the post-synaptic neuron.

In the knob-like structure of the axon terminals, chemicals called neurotransmitters are stored. When the electrical signal reaches the axon terminal, neurotransmitters must be released into the gap between neurons so that the communication process can continue.

When the action potential reaches the end of the axon, neurotransmitters from vesicles in the membrane of the terminals are released into the synapse. They bind to receptors in the membrane of the dendrites on the post-synaptic cell. Receptors and neurotransmitters act like a lock-and-key system. Just as it takes the right key to open a specific lock, a neurotransmitter (the key) will only bind to a specific receptor (the lock). Unused neurotransmitters are 'recycled' by being taken up by the pre-synaptic neuron and repackaged in the axon terminal.

Neurotransmitters can be excitatory or inhibitory. Excitatory neurotransmitters cause the message to be passed along in the post-synaptic neuron. An example of an excitatory neurotransmitter is glutamate. An inhibitory neurotransmitter prevents electrical transmission of the message in the target neuron. An example of an inhibitory neurotransmitter is Gamma-Animo Butyric Acid (GABA).

HELPFUL ONLINE RESOURCES

Watch the communication between two neurons.
https://tinyurl.com/mtr6z9ab

Glutamate and GABA

Glutamate is the most abundant excitatory neurotransmitter in the nervous system. It ensures that neural messages are communicated effectively by causing post-synaptic neurons to fire. Glutamate plays a key role in learning, memory and other aspects of cognition. Imbalances in glutamate can lead to disorders such as dementia, Alzheimer's disease and seizures.

GABA is the primary inhibitory neurotransmitter in the nervous system. GABA stops post-synaptic neurons from firing when the neural message has reached its destination and doesn't need to be passed on any further. Many psychiatric illnesses have been linked to low concentrations of GABA, such as anxiety and depression, where heightened levels contribute to difficulties with concentration and sleep.

Almost every neuron in the nervous system utilises glutamate and GABA. Along with a range of other chemical messengers, these ensure that the transmission of neural messages is efficient, specific and well controlled.

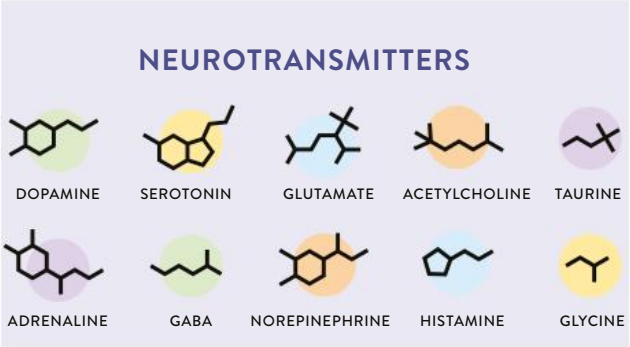


Figure 2.2.3: Different neurotransmitters used by the nervous system.

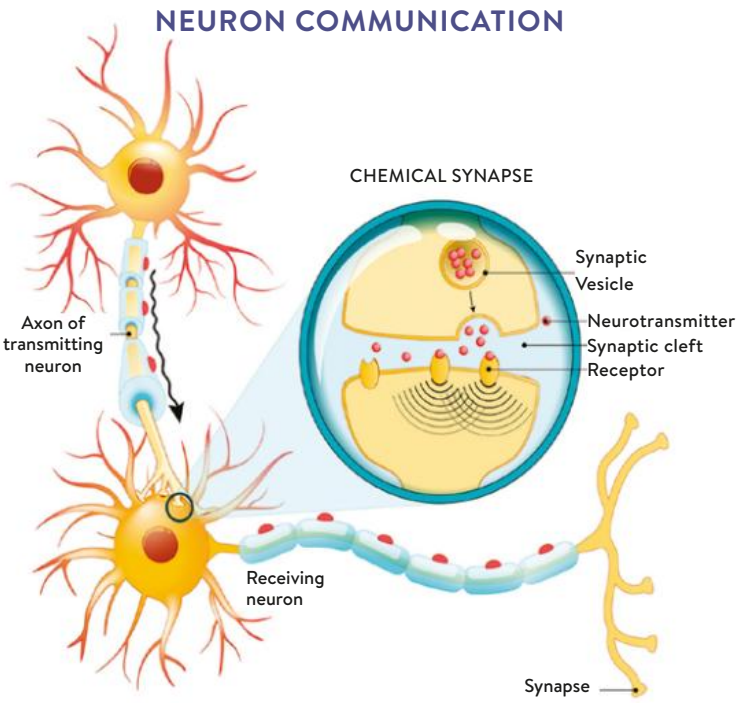


Figure 2.2.4: Neurotransmitters are released into the synapse between neurons.

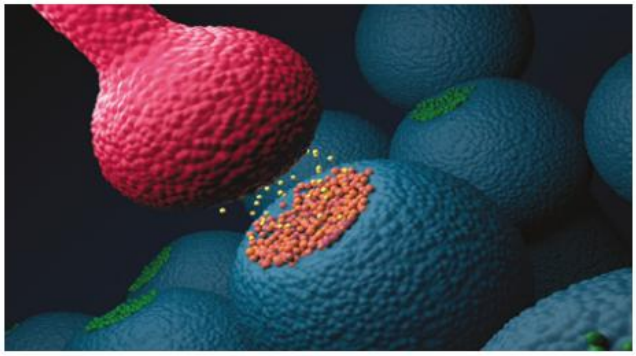
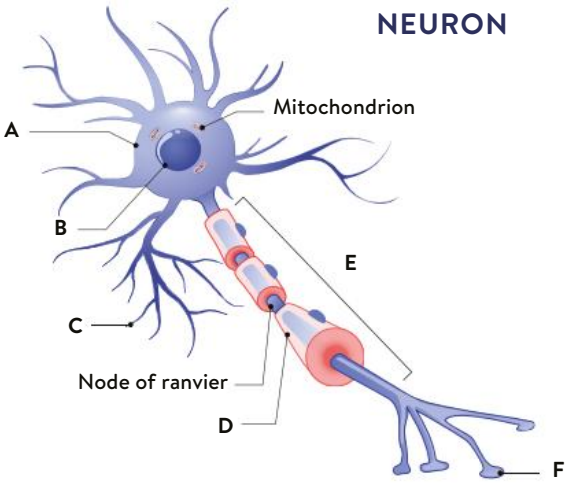


Figure 2.2.5: 'Neurotransmitters are released into the gap between neurons'.

CHECKING FOR UNDERSTANDING

1. Label the neuron using the terms provided:



Terms:

Axon Terminal, Cell Body, Myelin, Nucleus, Axon, Dendrites

A: _____

B: _____

C: _____

D: _____

E: _____

F: _____

CHECKING FOR UNDERSTANDING

2. Using the six anatomical structures in the box on the previous page, connect each term with the definition.

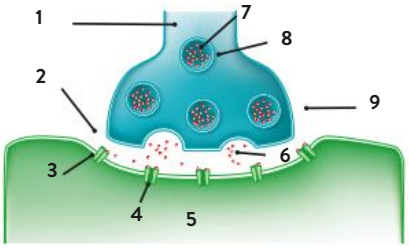
DEFINITION	STRUCTURE
Known as the soma, contains the nucleus and mitochondria	
The protrusions that receive a message from another cell	
The part that contains the DNA of the neuron	
The fatty insulation that keeps the electricity inside the cell	
The protrusions that pass a message on to another cell	
The long tail along which the electrical signal moves	

3. Explain how the structure of a neuron allows for efficient functioning.

4. Multiple Sclerosis is a disease where the myelin sheath becomes damaged. Some of the symptoms of Multiple Sclerosis are disturbances of sensation and movements, muscular weakness, loss of coordination and speech difficulties. Using your knowledge of how nerve signals are transmitted and the role of the myelin sheath in the efficiency of the nervous system, explain why these symptoms are seen.

a) The scientific name for a nerve cell is
a. Neuron
b. Electron
c. Neutron
d. Proton

For questions b-f refer to the image below:



b) Structure 1 is:
a. An axon terminal
b Myelin
c. The cell body
d. A dendrite

c) Structure 2 is:
a. A neurotransmitter
b. The myelin sheath
c. The axon
d. The synapse

d) Structure 3 is:
a. A dendrite
b. The synapse
c. A receptor
d. The soma

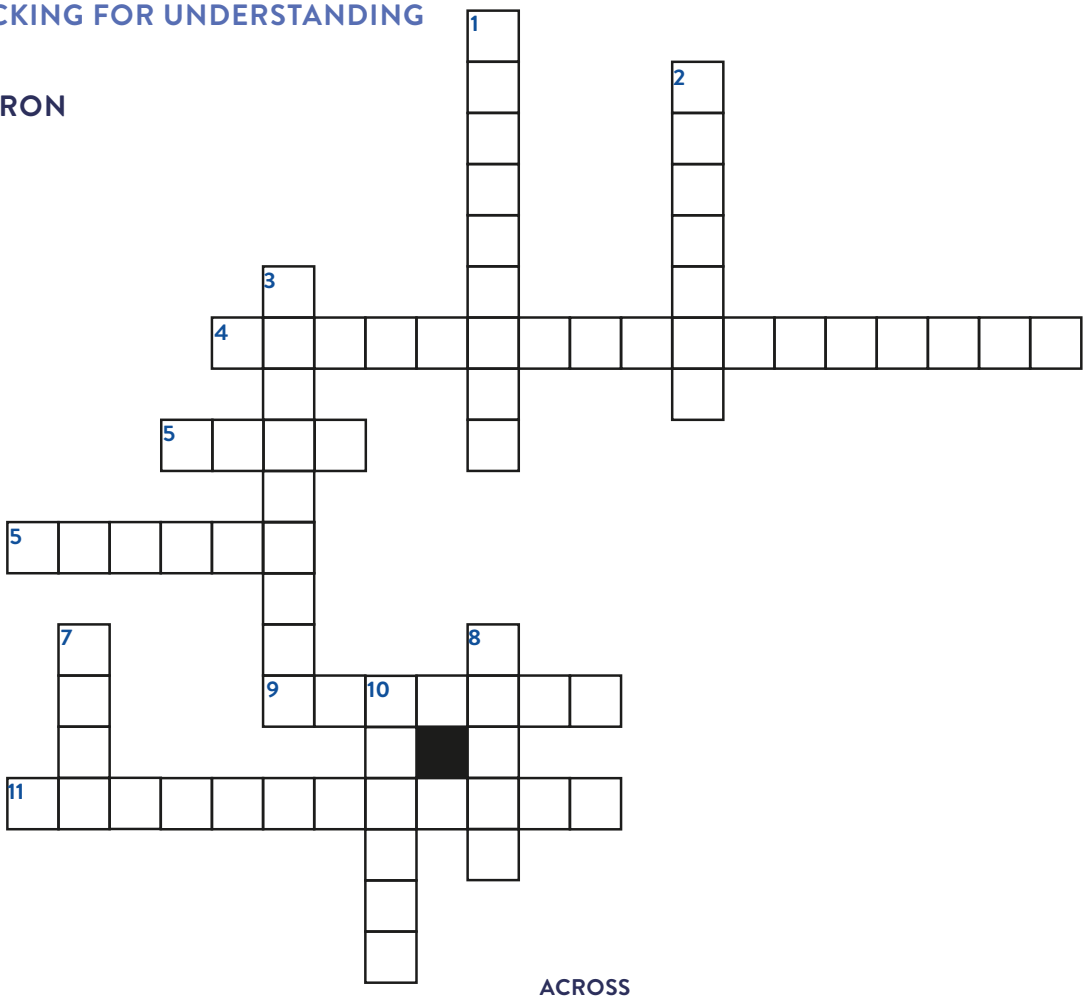
e) Structure 5 is
a. The Axon Terminal
b. The Nucleus
c. A Dendrite
d. A Neurotransmitter

f) Structure 6 is
a. Myelin
b. Part of the axon
c. A dendrite
d. A neurotransmitter

g) Which of the following is correct?
a. Neural signals pass down the axon as electricity and are converted to chemicals at the synapse.
b. Neural signals pass down the axon as neurotransmitters and are converted to electricity at the synapse.

CHECKING FOR UNDERSTANDING

NEURON



DOWN

1. Protrusions surrounding the cell body
2. The gap between two neurons
3. The bulbs on the end of the axon
7. The long, thin tail connected to the cell body
8. Type of neuron that sends messages to the muscles and glands
10. The longest cell in the human body

ACROSS

4. Chemicals that are realeased at the synapse
5. The cell body of the neuron
6. The fatty subtance that insulates the axon
9. Type of neuron that sends messages to the brain
11. Connect sensory neurons to motor neurons

EXTENSION ACTIVITIES – FURTHER RESEARCH

Neurogenesis is the process by which neurons are formed in the brain. Two types of neurogenesis are SYNAPTOGENESIS and DENDRITIC ARBORIZATION.

Do some brief research on these two types of neurogenesis and use your findings to answer the following questions:

a) What is synaptogenesis and at what stage of one's life does it occur in abundance?

..

..

..

b) What is the functional purpose of dendritic arborization?

..

..

..

2.3 THE BRAIN

- The brain, as part of the central nervous system, consists of numerous structures that contribute to psychological and behavioural responses in a variety of ways.
- Discuss the different lobes (frontal, temporal, parietal, occipital) and their functions.
- Discuss specialised structures (such as the prefrontal cortex, hippocampus, amygdala) and their functions

2023 Subject Outline | Stage 1

Brain anatomy

INTRODUCTION

The brain is the most complex part of the human body. It controls everything we think, feel and do, both consciously and unconsciously. The adult brain weighs approximately 1400 grams, and exists inside the skull, connected to the spinal cord by the brain stem.

Within the skull, the brain is protected by **cerebrospinal fluid (CSF)**, which is a clear liquid that fills and surrounds the brain and spinal cord. CSF protects the brain from sudden impact, as well as nourishes the tissue of the brain, and removes wastes.

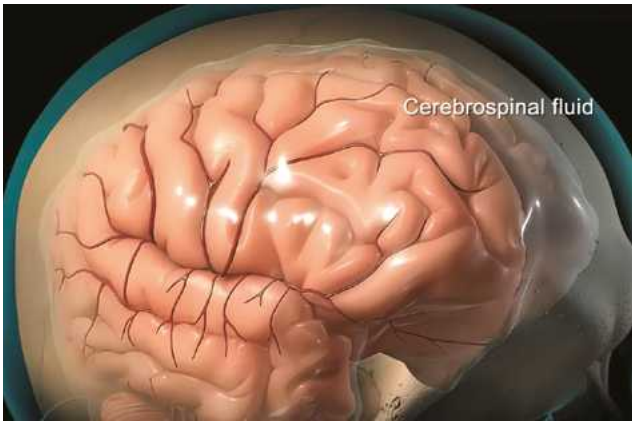


Figure 2.3.1: Cerebral Spinal Fluid surrounds the brain within the skull.

CSF supports the weight of the brain, allowing it to remain buoyant within the skull. Most adults have approximately 150ml of CSF, meaning that the layer of liquid surrounding the brain is actually quite thin. The fluid doesn't only exist around the outside of the brain, but also permeates the cavities within the grooves of the brain tissue (ventricles).

The brain has three main regions – the **hindbrain**, the **midbrain**, and the **forebrain**.

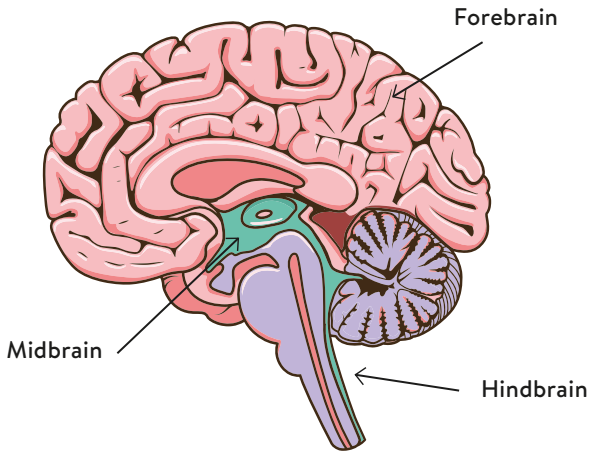


Figure 2.3.2: The three regions of the brain: the hindbrain, midbrain and forebrain.

HINDBRAIN

The hindbrain is located at the lower, back of the brain. It is composed of three key structures – the **pons**, **medulla** and **cerebellum**.

The hindbrain coordinates functions that are fundamental to survival, including breathing, heart rate, movement and sleep. It is one of the most important parts of the central nervous system as it connects the brain to the spinal cord, allowing the transmission of motor and sensory messages.

PONS

The pons is part of the brainstem, the structure that connects the spinal cord to the brain. It is the point of origin or termination for important cranial nerves that transfer sensory and motor information to and from the brain. These nerves control eye movements, facial movements, chewing and balance.

The pons allows the cerebellum to communicate with the rest of the brain. It also works together with a structure called the **medulla oblongata**, which sits just below it in the brain stem, to coordinate breathing. It is also believed that Rapid Eye Movement (REM) during sleep relies on the function of the pons.

Diseases affecting the small vessels in the pons can lead to **pontine stroke**, causing an intracerebral haemorrhage (bleeding in the brain). The function of the pons can also be impacted by brain tumours, concussion, or infections.

Damage to the pons is often fatal, with mortality rates at 40-50%. (Sripontan. S, 2019). In survivors, damage to different areas of the pons will affect the body differently. Some common symptoms include a lack of coordination, double vision, paralysis and nausea.

CHECKING FOR UNDERSTANDING

1. Explain two ways in which the brain is protected.

2. Explain the function of the hindbrain.

A 2019 study in the Asian Journal of Neurosurgery details the symptoms and recovery of a patient who suffered a massive pontine haemorrhage, caused by a stroke due to a blood clot. He was only 42 years of age but had a history of heavy smoking and poorly controlled blood pressure.

The initial symptoms of the stroke were projectile vomiting, followed quickly by a loss of consciousness. Upon presentation to the hospital, it was revealed that the patient also had dangerously low levels of salts in his bloodstream, as well as high levels of glucose. He required the use of machines to regulate his blood oxygen levels and balance his fluid input with urine output. The patient was kept under anaesthesia in a coma.

Surgery was required to remove the clot and reduce the pressure on the brain caused by the internal bleeding. Doctors reported on the patient's recovery:

DAYS SINCE STROKE	STRUCTURE
7	Pupils reactive to light. Tracheostomy performed.
14	Ventilator disconnected
28 (four weeks)	Patient can breathe on his own and respond to simple commands such as 'close your eyes'.
42 (six weeks)	Patient can sit on a chair and communicate using simple words.
56 (eight weeks)	Patient can sit with support and swallow some soft foods.
112 (16 weeks)	Patient can show facial expressions and can stand by himself.
140 (20 weeks)	Patient can have a conversation, grasp objects and walk with some assistance
168 (24 weeks)	Motor and communication skills recovered. Can stand and walk by himself.

This summary of the recovery process demonstrates the length of time needed to recover from an injury to the pons, as well as the autonomic and somatic processes that are impacted. However, the research paper highlights the progress made in terms of scientific understanding and treatment procedures associated with pontine haemorrhage – as recently as 1998, mortality rate was as high as 100% in patients suffering from the condition.

Figure 2.3.3: Computed tomography scan of the brain at admission revealed a large hematoma at the base of the pons.

Figure 2.3.4: Photos of patient being able to sit up with support after 8 weeks (a), stand with support after 16 weeks (b) and demonstrating improved swallowing function after 20 weeks (c).

MEDULLA OBLONGATA (MEDULLA)

Together, the medulla and pons are often referred to as the brain stem. The medulla is a stem-like structure that sits below the pons and connects the brain stem to the brain. The medulla is vital in the transmission of messages between the spinal cord and the higher areas of the brain.

The medulla is where the cardiovascular and respiratory systems are coordinated simultaneously, which allows heart rate, blood pressure and breathing to be regulated concurrently. Other autonomic functions including vomiting, sneezing, coughing and maintaining balance are also controlled by the medulla.

The medulla is also the location where nerves that control movement cross over. This is why the left side of the brain controls the right side of the body, and vice versa. The cranial nerves that innervate the pons also pass through the medulla, meaning that the medulla is also integral to activating salivary glands, swallowing, use of the voice box and movement of the upper torso and head.

Similar to the pons, blood clots and haemorrhage can cause significant damage to the medulla and impact the vital functions it controls.

CEREBELLUM

The term 'cerebellum' is Latin for 'little brain', so called because it shares many similarities with the main portion of the brain, the cerebrum. They both have bumps and grooves on their exterior and have two hemispheres. The cerebellum sits at the base of the brain, connected to both the medulla and the pons. The cerebellum contains up to 50% of the total number of neurons in the brain, despite only accounting for 10% of its size.

The cerebellum plays an important role in motor control. Movement commands are not initiated in the cerebellum; however, the cerebellum ensures that the movements enacted are coordinated, precise and accurate.

Figure 2.3.5: The cerebellum sits at the base of the brain attached to the brain stem.

The cerebellum also controls posture, balance and coordination. Imagine standing on one leg or walking along a narrow ledge. The cerebellum is continually monitoring the position of your body in space, and automatically makes postural adjustments to your body to ensure you maintain balance. It does this by sending messages to the motor neurons responsible for muscle movement, based on feedback from sensory neurons providing information about the external environment.

The cerebellum is composed primarily of a type of neuron called Purkinje cells, which are surrounded by a mass of dendrites – in a more dense array than other neurons. Purkinje cells are connected to more synapses than any other cell in the brain, using GABA as their excitatory neurotransmitter.

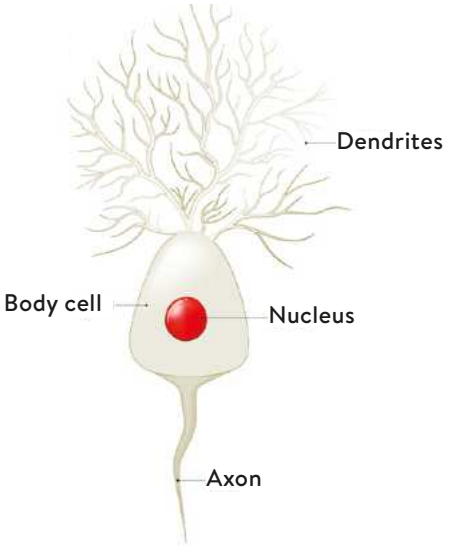


Figure 2.3.6: The cerebellum is composed of Purkinje cells.

While it used to be believed that the cerebellum's primary function was the coordination of movement, advancements in scientific imaging technology have also revealed cerebellum activation related to language, attention and the perception of emotional body language.

Much of what we know about the function of the cerebellum comes from the disabilities observed in patients who have suffered harm to this part of the brain. Damage to the cerebellum can be caused by stroke, tumour, genetic disorders and alcohol misuse.

One of the common symptoms of cerebellar damage is ataxia. Ataxia is difficulty with the coordination of muscles, meaning that sufferers experience awkward and clumsy movements. Another condition caused by damage to the cerebellum is dysarthria, a disorder where speech is slurred due to poor control over the larynx, commonly known as the voice box. Further symptoms such as dizziness, paralysis, tremors and vision problems can also result from harm to the cerebellum.

MULTIPLE SCLEROSIS

Multiple Sclerosis (MS) is a chronic and progressive disease of the nervous system where the body's immune response attacks myelin, the fatty sheath that covers the axon of neurons.

Myelin is an insulating layer of fat and protein that covers and protects the axon, allowing for efficient and accurate transmission of electrical messages along the axon. MS causes permanent damage and deterioration to the myelin, impacting the ability for the brain to communicate with the rest of the body.

The symptoms and severity of MS differ significantly between patients, and usually become more debilitating as the disease progresses. Some sufferers of MS may lose the ability to walk independently while others may enter remission where no symptoms are evident for a period of time.

Common symptoms include feelings of numbness, weakness and tingling in the limbs, a lack of coordination, unsteady gait, mood disturbances and difficulties with vision, which can include partial or complete loss of sight, usually in one eye at a time.

While MS initially presents as a series of episodes, separated by periods of remission, eventually a sufferer's health deteriorates to a point where symptoms become constant.

While there is no cure for MS, treatment focuses on slowing the progression of the disease and managing the symptoms it causes. Corticosteroids can be used be reduce nerve inflammation. There are a number of injectable drugs which, if administered as soon as MS is diagnosed, may lower the chance of relapse and potentially slow the progression of the disease. These medications work to encourage nerve growth and block the immune system's attack on the myelin sheath.

MS sufferers may also undertake physical therapy to learn stretching and strengthening exercises to aid mobility and manage muscle weakness in the legs. Muscle relaxants can also be taken orally to help reduce muscle stiffness and spasticity.

Hear more about the symptoms of MS with The Doctors.
https://tinyurl.com/bdfyt7wa ©

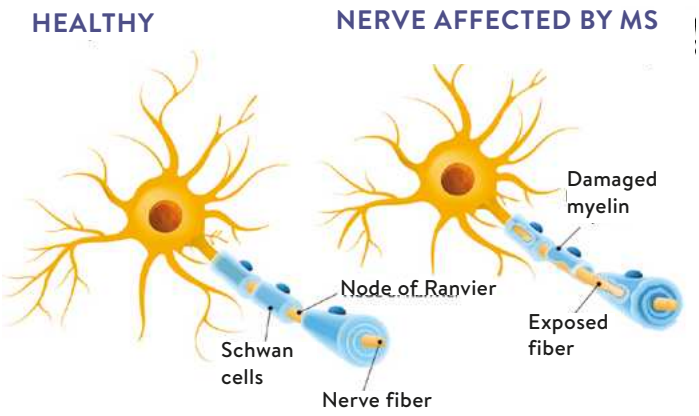


Figure 2.3.7: Sufferers of Multiple Sclerosis have damaged myelin sheaths.

MID BRAIN

The midbrain sits at the top of the medulla and is associated with vision, hearing, arousal, temperature regulation and the sleep-wake cycle. It also plays a role in the movement of the eyes and the eyelids, as well as the processing of auditory and visual signals before they are passed on to key areas in the forebrain. The midbrain also regulates alertness and is believed to be involved in suppressing pain. Deep in the midbrain is a structure called the Substantia Nigra, a cluster of neurons with a dark pigment. The cells within this tissue create the neurotransmitter Dopamine, which is needed for the coordination of movement. The Substantia Nigra is the area of the brain damaged by Parkinson's Disease.

FOREBRAIN

The forebrain is the largest portion of the brain. It contains the entire cerebrum as well as the thalamus, hypothalamus, pineal gland, and limbic system which sit beneath it. The forebrain controls reproductive functions, sleeping, eating, emotion and body temperature. It is also the part of the brain responsible for thinking, reasoning and processing.

The structure of the forebrain can be best understood by considering the external and internal structures that comprise it.

EXTERNAL STRUCTURES

The majority of the forebrain is the cerebrum, which is the largest part of the brain. Together with the cerebellum, it controls all voluntary actions in the human body. If you imagine what a brain looks like, you are imagining the cerebrum. The cerebrum is divided into two halves called hemispheres.

The tissue within the brain is often referred to as 'grey matter' and 'white matter'. This is because, when a brain is scanned or dissected, two distinctly different types of tissue are seen – one darker than the other. Grey matter exists in the outer-most layers of the brain. Its darker

colour comes from a high concentration of cell bodies. The tissue deeper within the brain appears white due to the high density of myelinated axons. Grey matter is primarily responsible for processing and interpreting information, while white matter transmits information to other parts of the nervous system.

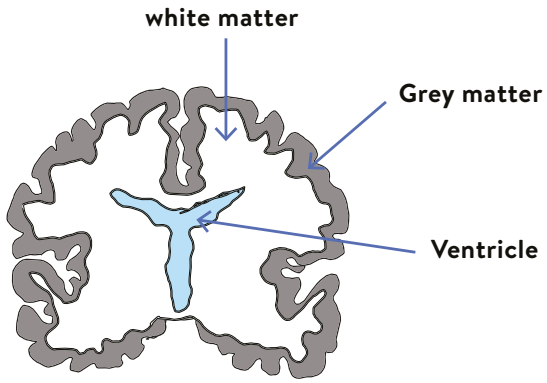


Figure 2.3.8: Tissue within the brain is often referred to as 'white matter' and 'grey matter'.

CEREBRAL CORTEX

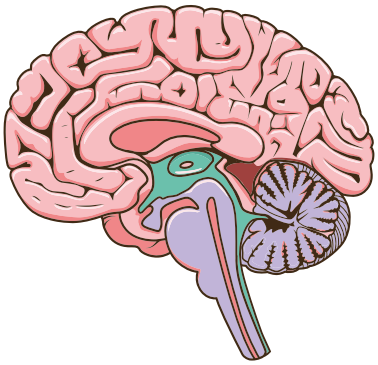
The cerebral cortex is the outermost layer of the brain. It appears wrinkled due to the **gyri** and **sulci**, ridges and grooves which maximise surface area. Two important structures within the cerebral cortex are the **sensory cortex** and the **motor cortex**.

As the name suggests the sensory cortex is a band of tissue within the cerebral cortex that is responsible for receiving sensory information from the internal and external environment and processing it accordingly. Directly adjacent to the sensory cortex is the motor cortex, responsible for the control and execution of voluntary movement.

Directly beneath the cerebral cortex is a region of highly concentrated neurons called **basal ganglia**. These cells assist in the coordination of movement by filtering messages sent by the brain to ensure only necessary signals are acted upon, and incorrect transmissions are ignored. Disruption or malfunction of the basal ganglia forms the basis for several movement disorders, including Parkinson's disease, epilepsy and Huntington's disease.

CHECKING FOR UNDERSTANDING

On the diagram below, label the hindbrain, cerebellum, pons, medulla, midbrain and forebrain.



BRAIN LOBES

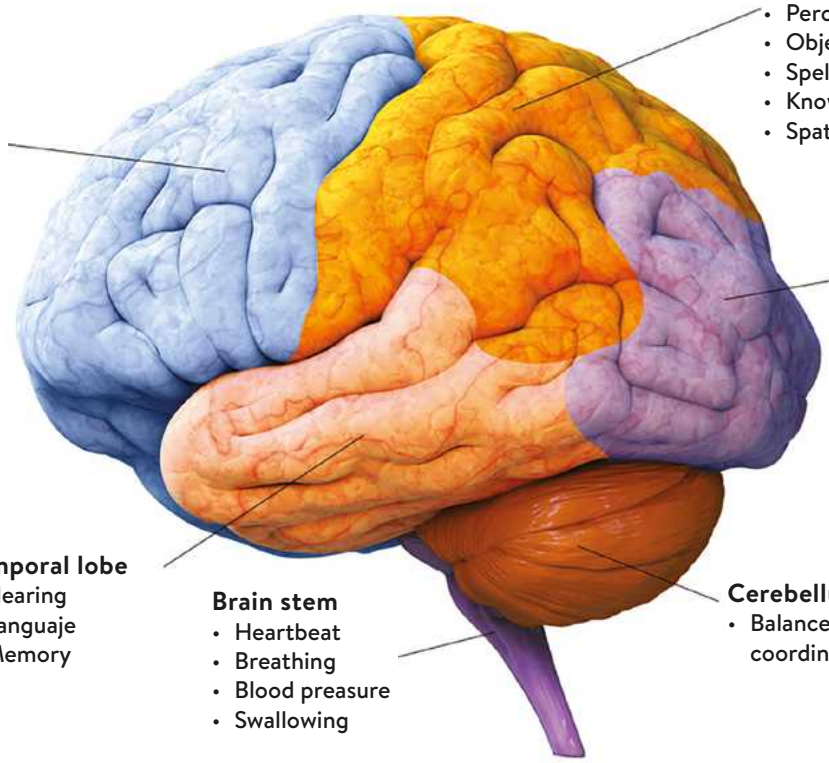


Figure 2.3.9: The cerebrum has four lobes: Frontal, Parietal, Temporal and Occipital.

The cerebrum is classified into four lobes: temporal, parietal, occipital and frontal.

TEMPORAL LOBE

The temporal lobes sit behind the ears. They are vital in the creation of long-term memories, in conjunction with the hippocampus and amygdala. The temporal lobes are also responsible for auditory processing - understanding the meaning of language and remembering verbal information. In most people, the left temporal lobe is considered dominant, with the primary function of language comprehension. The right temporal lobe is involved in learning and remembering non-verbal information, such as visual-spatial cues and music.

The **auditory cortex** is a part of the temporal lobe that processes auditory information. When sound is detected by sensory neurons, it must be converted to the perception of language before it makes sense to us, and we understand that it has meaning. Studies have shown that cells in the auditory cortex also become activated when sounds of differing pitch are presented.

One of the most complex structures within the temporal lobe is the hippocampus. The **hippocampus** plays a vital role in human learning and memory. It is also part of the **limbic system** which controls our behavioural and emotional responses. The hippocampus is responsible for the transfer of short-term memory into long-term memory. It also enables spatial memory, which allows for the planning of routes to certain sites and the memory of where objects and events are located.

The function of the hippocampus declines in sufferers of the aging disease, dementia. It is one of the first regions of the brain to be impacted, causing the common symptoms of memory loss and disorientation.

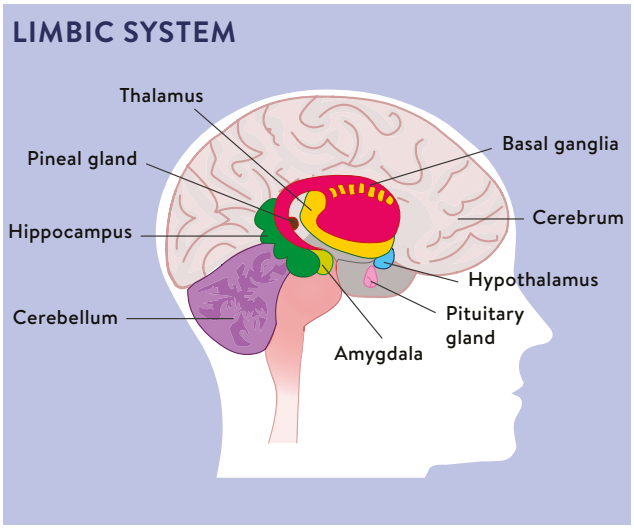


Figure 2.3.10: The Limbic System is a group of structures within the brain that control emotional responses.

ACTIVITY

Make a brain hat to help you remember where each lobe is located!
https://tinyurl.com/3ak2v8kr

THE STORY OF 'PATIENT H.M'

A sufferer of epileptic seizures, Henry Molaison (known as H.M) underwent experimental surgery to remove part of the temporal lobe. This caused him to experience a severe memory impairment which was studied for over fifty years before his death in 2008.

H.M's epilepsy presented after he was knocked off a bicycle at 7 years old. In the subsequent years, his seizures became more and more severe, resulting in H.M being unable to maintain a job or live a normal life.

At the time, the removal of temporal lobe tissue was a procedure used to treat psychotic patients. H.M accepted the proposed treatment as a last resort.

The procedure worked to relieve H.M of his seizures. However, his memory was profoundly impacted. He could not retain memories of the current day. He forgot his own birthday and could not recall the names of people he was recently introduced to.

H.M lived to be 82 years old. His experiences have been integral to the scientific understanding of the temporal lobe and its role in the formation of memories.

https://tinyurl.com/2d9ba5e2

AMYGDALA

The amygdala sits directly adjacent to the hippocampus, located deep in the temporal lobe. It is part of the limbic system, and plays an important role in decision making, memory and the coordination of emotional responses. The amygdala is known for its involvement in the experience of anger and aggression, driving the 'fight or flight' response when faced with threat. Feelings of anxiety and worry are also attributed to the amygdala, with temporal lobe lesions contributing to panic attacks in some patients. The amygdala also allows us to determine emotions expressed in facial expressions.

At an evolutionary level, the amygdala is vital to linking emotion and memory. Experiences that cause strong emotional responses, both positive and negative, are often the result of threatening situations that should be avoided, or pleasant situations that should be pursued to ensure survival of a species.

The amygdala was first linked to fear in the 1930s when two scientists, Heinrich Klüver and Paul C. Bucy, removed the temporal lobes of rhesus monkeys. The result was that the monkeys seemed to lack fear, approaching objects and animals that would usually frighten them, such as snakes, without concern. However, more recent studies have shown that if monkeys with damage to the amygdala are raised in social groups with other monkeys, their emotional and fear-related behaviours often develop to be quite normal. This indicates that emotional impairment caused by damage to brain structures can be somewhat mitigated by the nurture of an appropriate social situation.

The amygdala is involved in learning, and the appreciation of rewards. For example, when a reward is presented, the neurons in the amygdala fire, signalling to the brain that the stimulus is desirable. This has been supported by Magnetic Resonance Imaging (MRI) in animal studies. Similarly, the amygdala contributes to the process of extinction (unlearning) by recognising when a reward is no longer presented. Studies have suggested that the learned association between events or objects and the experience of fear does not occur effectively in patients with damaged amygdala.

The amygdala is larger in males than it is in females; however, the female amygdala develops approximately 18 months before males. It is suggested that these differences occur because the amygdala is sensitive to levels of testosterone in the body, which are significantly higher in males. Studies have also indicated that women retain emotional memories more effectively than men.

HYPOTHALAMUS

The hypothalamus is also part of the limbic system, a set of structures within the temporal lobe involved in emotional responses. The hypothalamus is integral to the behaviours needed for survival: feeding, reproduction and the fight or flight response.

The hypothalamus acts as a control centre, essential to **homeostasis**, the maintenance of an internal 'steady state'. Homeostatic processes are regulated by the hypothalamus to ensure that the many systems of the body maintain stability while adjusting to changes in the environment.

The hypothalamus is an important link between the nervous system and the **endocrine system**. The endocrine system refers to the numerous glands and organs that create and secrete hormones into the blood stream. Hormones are essential to the efficiency of neural transmission, therefore the nervous system and endocrine system work in synergy to ensure this occurs.

Another term commonly used to describe the hypothalamus is a 'relay station'. A relay station is a radio station that receives radio signals, and then re-transmits them. This is similar to the role of the hypothalamus, which receives input from the peripheral nervous system and the brain about the body's internal and external environments. The job of the hypothalamus is to determine the response necessary to maintain homeostasis, and then 'relay' these instructions to the appropriate organs and glands. The hypothalamus also has direct control over the autonomic functions needed for this stability.

In this way, the hypothalamus controls many functions essential for survival, including body temperature, hunger, thirst, blood pressure, sex drive, sleep and mood.

The hypothalamus controls other glands by creating and secreting its own hormones, that initiate or inhibit the further production of hormones by other tissues. The hypothalamus is specifically involved in the function of the pituitary gland, a gland that secretes a number of essential hormones, including Growth Hormone and Prolactin.

The hypothalamus produces the 'feel good' hormone dopamine which provides a sense of pleasure. Dopamine is also an inhibitory hormone that causes the **pituitary gland** to stop producing prolactin, responsible for the production of breast milk in women. The hypothalamus also produces oxytocin and vasopressin.

Vasopressin is the hormone that regulates the balance between water intake and the creation of urine.

HELPFUL ONLINE RESOURCES

Find out how alcohol affects the hypotalamus.
https://tinyurl.com/45vuzkat

PITUITARY GLAND

The pituitary gland is located directly beneath the hypothalamus in the temporal lobe. It is connected to the hypothalamus by a series of blood vessels and nerves. The pituitary gland creates many essential hormones and also controls hormone secretion from other glands.

The pituitary gland has two lobes: the anterior and posterior. The anterior lobe creates and secretes hormones while the posterior is used to store the hormones created by the hypothalamus.

The anterior lobe synthesises **Adrenocorticotropic Hormone (ACTH)** which plays a role in how the body responds to stress. ACTH stimulates the adrenal glands to secrete cortisol, integral to the fight or flight response. Hormones responsible for the production of sperm in males and eggs in females are also created by the anterior lobe of the pituitary gland.

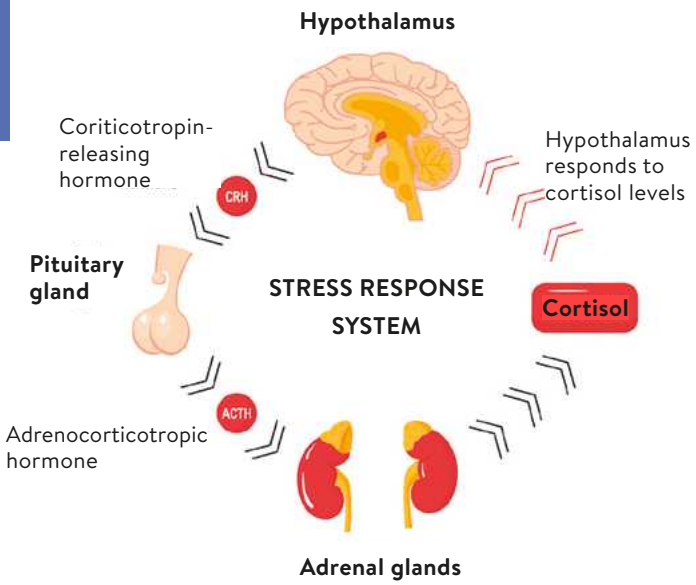


Figure 2.3.11: The Hypothalamus coordinates the Fight or Flight response.

The pituitary gland can be damaged by a lack of blood flow, tumour, or head trauma. While minor damage may be repaired by the gland, major damage has the potential to inhibit function. Symptoms of a damaged pituitary gland include headaches, vision problems, muscle wasting and pale complexion. These symptoms may indicate a specific condition caused by a malfunctioning pituitary.

Hypopituitarism refers to an underdeveloped anterior pituitary, evident from birth. Children suffering from hypopituitarism experience slow growth due to a lack of growth hormone. Puberty may also be delayed due to low levels of **gonadotrophins**, the hormones responsible for ovarian and testicular function.

Cushing's Disease is a disorder caused by an overactive pituitary, often the result of a tumour pressing on the gland. It is characterised by excess secretion of ACTH, causing the individual to become overweight. Other symptoms include tiredness, excessive drinking, and milk secretion, due to increased levels of Prolactin.

Together, the hypothalamus and the pituitary gland play a vital role in the interaction between the endocrine and nervous systems. The hormones secreted by the hypothalamus communicate with and stimulate the pituitary gland to synthesise many essential hormones that act on the thyroid, reproductive organs and adrenal glands.

THALAMUS

The thalamus is also located within the temporal lobe, lying adjacent to the hypothalamus at the top of the brain stem. Like the hypothalamus, the role of the thalamus is to act as a relay station. The thalamus regulates sleep, wakefulness, learning and memory. It also plays a role in prioritising attention, and relaying motor information. The thalamus is connected to other structures within the limbic system, so is also involved in the regulation of emotion.

Unlike the hypothalamus, the thalamus is not considered part of the endocrine system.

SCIENCE AS A HUMAN ENDEAVOUR

The following story was posted on the Cancer.org website in October, 2022.

WHAT'S NEW IN PITUITARY TUMOUR RESEARCH?
Research on pituitary tumour genetics and classification

Doctors now better understand the gene changes in cells that can lead to pituitary tumours.

This is already leading to improvements in genetic testing for people who are suspected of having multiple endocrine neoplasia, type I (MEN1) or other inherited syndromes that increase the risk of pituitary tumours.

Understanding the gene and protein changes inside tumour cells is also helping doctors better classify pituitary adenomas, as well as better customize treatments for people with these tumours.

This type of research might also make it possible to identify specific gene changes and biomarkers in a person's tumour cells. This could help doctors know, for example, whether a pituitary adenoma is more likely to grow aggressively or to come back after treatment, which in turn might affect a person's treatment options.

Imaging tests such as MRI scans continue to improve, leading to better accuracy in finding and determining

the size of new tumours and those that come back after treatment. Studies are now looking at whether using MRI during surgery (known as **intraoperative MRI**) might help ensure tumours are removed completely.

Other types of imaging tests, such as newer types of PET scans, are also being studied in clinical trials.

Robotic surgery, in which the surgeon sits at a control panel and precisely moves robotic arms, is also being studied as a way to reach these tumours and limit side effects.

DISCUSS

After reading the excerpt above, discuss the evidence for the SHE concepts:

- **Communication and Collaboration**
- **Influence**
- **Development and Application**

PINEAL GLAND

The pineal gland is a small gland in the centre of the brain. Its primary role is to regulate the sleep-wake cycle through the secretion of a hormone called **melatonin**. The sleep-wake cycle is controlled by **circadian rhythm**, a 24-hour internal 'clock' that causes waking and sleeping to occur at approximately the same time every day, according to light cues from the environment. Higher amounts of melatonin are secreted from the pineal gland when low levels of light enter the eye. Therefore, as humans prepare for sleep, melatonin is secreted, which assists in feeling drowsy and preparing our body for slumber.

While a 2017 study by De Crescenzo et. al. concluded that melatonin production is not linked to mental health disorders such as depression, it is known that interruptions to the sleep-wake cycle are linked to poor mental health, with sleep deprivation causing existing mental health issues to worsen. **Seasonal Affective Disorder** is a type of depression triggered by a change in seasons. This could be caused by a reduction or increase in daylight, leading to altered levels of melatonin being secreted from the pineal gland.

The pineal gland has also been linked to other functions, including bone metabolism. It has been suggested that the natural decline in pineal gland action as we age is correlated with decreased bone density and potential osteoporosis, especially in women.

PINEAL GLAND

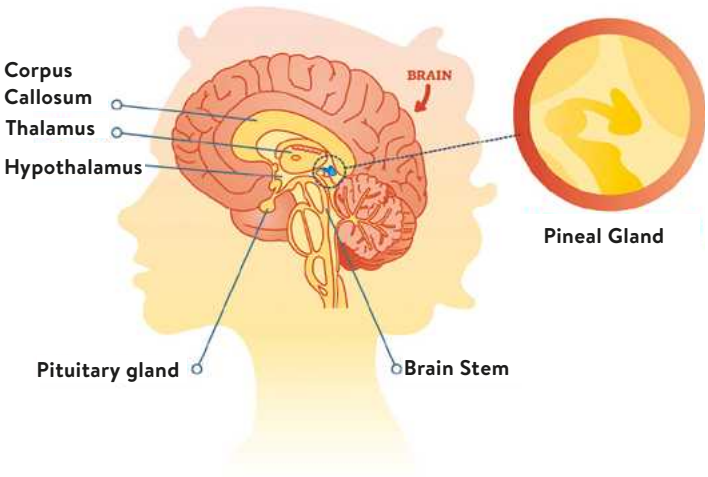


Figure 2.3.12: The Pineal Gland is located in the centre of the brain.

OCCIPITAL LOBE

The occipital lobes sit at the back of the brain, above the cerebellum. It is dedicated to vision, and the number of complex roles that this entails. The occipital lobe contains the **visual cortex**, a region of the brain that receives visual information from the retina in the eye. This information is processed by the occipital lobe, which executes a range of functions, one of which is referred to as 'mapping the visual world'. Mapping relates to utilising the memory of the visual environment to enhance one's spatial reasoning, the ability to consider the position of 3D objects in space. The occipital lobe also determines colour, distance, size and depth of visual objects. This information is then relayed to other areas of the brain which apply meaning to these objects and coordinate a response if needed. The temporal lobe assigns memories to the information transmitted by the occipital lobe.

Damage to the occipital lobe, either by brain trauma, stroke or tumour, can cause difficulty in identifying colours, production of hallucinations and struggles with reading and writing.

PARIETAL LOBE

The parietal lobes are located at the top, rear of the cerebrum. Their primary function is to interpret perceptions of touch, including temperature, pressure, vibration, pain and body position. The receptors in the skin that detect information about touch are called **mechanoreceptors**. There are different types which respond to different aspects of touch, including vibrations, pain, texture, pressure and skin stretch. The parietal lobe also informs the brain about the position and movement of body parts, referred to as **proprioception**.

The network of neural structures within the parietal lobe that process these sensations is known as the **somatosensory cortex** which is a subset of the sensory

nervous system. It is a band of brain tissue that runs down the side of the cerebral cortex in each hemisphere. When mechanoreceptors detect change in the internal or external environment, they transmit this message to the thalamus and then to the somatosensory cortex. Research suggests that the more sensory input a region of the body provides, the more surface area of the parietal lobe is dedicated to that area.

The term **homunculus** is Latin for 'little man'. In neuroscience, it is the term used to describe the representation of the human body, based on the amount of tissue within the brain dedicated to processing sensory and motor functions. The amount of cortex representing each body part is not based on the surface area or volume of the structure, but rather how many neurons innervate the region. Areas of the body that perform complex or intricate functions generally require greater innervation and are therefore larger when represented as part of the homunculus. For example, due to the high number of sensory receptors in our face, as the primary location that information about sight, sound, smell and taste is detected, there is a large portion of the parietal lobe dedicated to receiving and processing their input. Different homunculi can be constructed for the sensory and motor cortices.

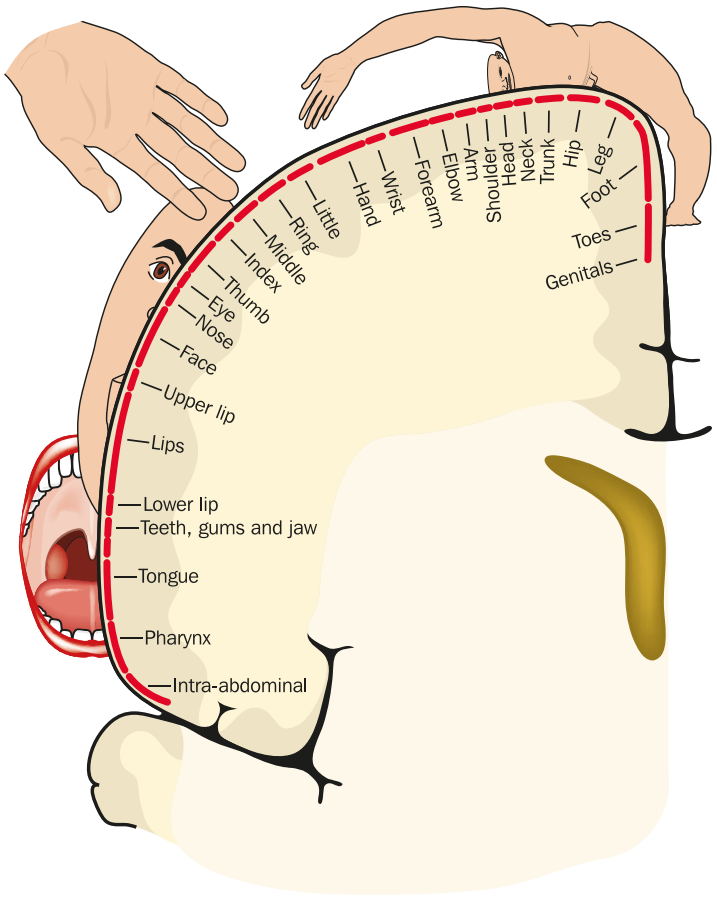


Figure 2.3.13: The Homunculus represents how much of the cortex controls each body part.

Other functions of the parietal lobe include the ability to discriminate that two points of pressure or pain on the skin are distinct points of sensory input, rather than one. You can test this by having a partner gently prick the skin on your palm with two pins approximately a centimetre apart. You should be able to feel two separate pricks; however, if the same test was repeated on your back, or another body part with a lower level of innervation, you may not be able to distinguish between one point of contact, or two. The parietal lobe also allows you to recognise writing on the skin, purely through the sensation of touch. This is known as **Graphesthesia**.

ACTIVITY

Test your graphesthesia with a partner! Write words with your finger on their back and determine how accurately they recognise them. Then swap – can you 'read' through the sensation of touch?

Interestingly, studies have shown that damage to the parietal lobe impacts the body differently, depending on which hemisphere has sustained trauma. Damage to the left hemisphere can cause a disorder known as **'Gerstmann's Syndrome'**, characterised by four key symptoms: a writing disability, difficulty with arithmetic, an inability to distinguish left from right, and finger agnosia – the inability to name, move or touch specific fingers.

Damage to the parietal lobe in the right hemisphere can result in a condition known as **contralateral neglect** where patients neglect the side of their body opposite to the damaged parietal lobe. This leads to difficulties with self-care, as half of the body is neglected in everyday hygiene practices such as showering, dressing, and grooming. Sufferers also lack awareness of this portion of space, only able to pay attention to and be aware of sensory input from the undamaged hemisphere.

HELPFUL ONLINE RESOURCES

Listen to Bob's experience of spatial neglect after suffering a stroke.
https://tinyurl.com/2s3h9kzz

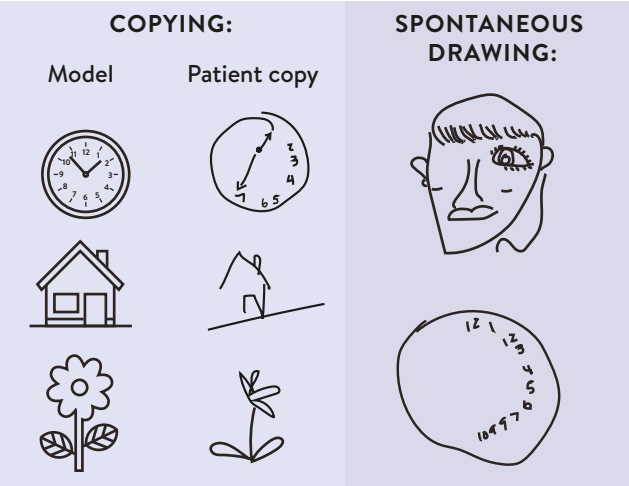


Figure 2.3.14: Pictures drawn by a patient with contralateral neglect after suffering a stroke.

CHECKING FOR UNDERSTANDING

1. **Explain why damage to the hindbrain is often fatal.**

2. **Explain what causes the disease Multiple Sclerosis.**

3. **Explain the function of the gyri and sulci (ridges and grooves) in the cerebral cortex.**

FRONTAL LOBE

The frontal lobes are the largest lobes in the brain. They are located behind the forehead, beneath the bones at the front of the skull. The frontal lobe is covered by the frontal cortex. Within this tissue is the motor cortex.

The motor cortex runs adjacent to the somatosensory cortex, across the top of the cerebrum and down the side of each hemisphere. The motor cortex is responsible for planning and executing voluntary movement. Just as in the somatosensory cortex, a homunculus is often used to represent the motor neurons innervating each body part. The greater the number of nerves controlling motor function, the larger the body part is represented on the homunculus.

The frontal lobe contains a high number of dopamine neurons which limit and select the messages sent to the frontal lobe from the thalamus.

In humans, the frontal lobe does not completely develop until the late 20s. Maturity of the frontal lobe tends to occur earlier in females than it does in males. Some deterioration of the frontal lobe occurs naturally with age.

Apart from controlling voluntary movement, the frontal lobe is involved in the use of language, particularly expressive language. It is also considered the part of the brain that determines personality, due to its association with expression of emotion, memory and impulse control.

The **prefrontal cortex** is the region of the cerebrum covering the frontal lobe. One of the most important roles of the prefrontal cortex is the control of executive functions. Executive functions refer to a set of cognitive skills needed for self-control and organising behaviours. Examples include flexible thinking, working memory and prioritizing tasks. It is also integral to inhibitory control, of exercising self-control over risk-taking behaviours. It is suggested that teenagers engage in more risk-taking due to their immature frontal lobe, meaning that the adolescent brain may be unable to completely assess the future consequences of current actions. The prefrontal cortex also influences decision making by determining whether a particular decision is morally or ethically sound.

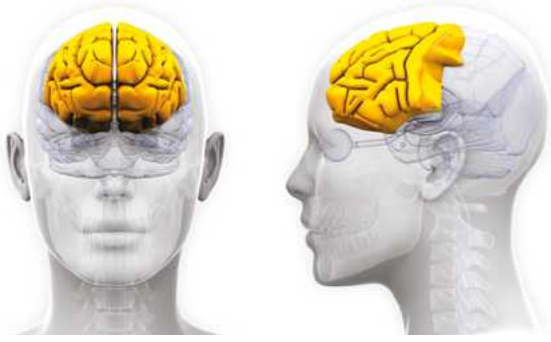


Figure 2.3.15: The frontal lobes are located behind the forehead.

DAMAGE TO THE FRONTAL LOBE

Because the frontal lobe plays a role in movement, emotion, personality, impulse control and memory, there is no other structure in the brain that has such far-reaching effects when damaged. Damage to the frontal lobe can occur through head trauma, such as an injury directly to the front of the skull. The frontal lobe shrinks in sufferers of dementia, its function is inhibited in sufferers of multiple sclerosis and a brain tumour or stroke can prevent blood supply to vital tissues within the lobe.

There are a wide range of symptoms associated with damage to the frontal lobe. Depending on the location and intensity of the trauma, patients may display one, some, or a diverse combination of symptoms.

Paralysis can occur, due to a trauma to the motor cortex. Damage to the frontal lobe in the right hemisphere in the brain will impact the left-hand side of the body and vice versa, due to the cross-over of nerves in the medulla.

Sufferers of frontal lobe injury may also have difficulty with the sequencing of tasks, meaning that they struggle to effectively implement the series of steps needed to achieve a simple goal, such as cooking a meal. They may also experience the inability to focus on a task and ignore distractions, have difficulty regulating their emotions and lack motivation. Other cognitive impacts include difficulties in problem solving and reduced levels of awareness.

Frontal lobe injury can cause a range of behavioural differences that can be interpreted as a change in personality. Sufferers may have difficulties controlling their emotions, experience mood fluctuations and exhibit changes in their social behaviour.

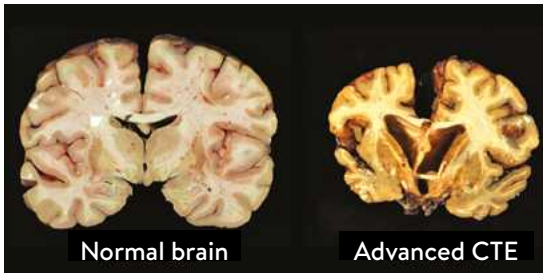
Patients sustaining injury to the prefrontal cortex do not usually exhibit the same symptoms as other sufferers of brain trauma. Their ability to move their body is not impacted and their cognitive functions remain intact. However, emotional changes may be evident to friends and family members who know the patient well. Many sufferers lack the ability to express emotions in their speech, facial expressions or body language, a phenomenon known as **blunted** or **flat affect**. They may also speak in a monotone and avoid eye contact. Trauma to the prefrontal cortex can also cause aggression and irritability in the sufferer, and difficulty with impulse control. Some carers of patients suffering from damage to this area of the brain have also identified a lack of empathy as a common symptom.

BROCA'S APHASIA

Broca's area is a location in the frontal lobe responsible for both language production and comprehension. In 1861, French doctor Pierre Paul Broca visited a patient who had suffered from a degenerative speech disorder for over 20 years; however, his mental functions and comprehension of speech were unaffected. Upon the patient's death, Broca noticed damage to the frontal lobe, in a region that became known as Broca's area. This finding led to the understanding that Broca's area was integral to the formation of sentences and the production of logical, articulate speech. Broca performed many more autopsies on patients suffering the same symptoms – hesitant and fragmented speech – and continued to confirm trauma to the same area of the frontal lobe. This condition became known as Broca's Aphasia.

HELPFUL ONLINE RESOURCES

Aaron Hernandez was an American footballer, playing for the Patriots in the NFL. An autopsy of his brain showed severe degeneration of brain tissue, a condition known as Chronic Traumatic Encephalopathy, often seen in athletes who have suffered multiple concussions or strikes to the head. To learn more about his condition and the impact on his behaviour, scan the code provided.
https://tinyurl.com/3huwjrpc



FRONTAL LOBE

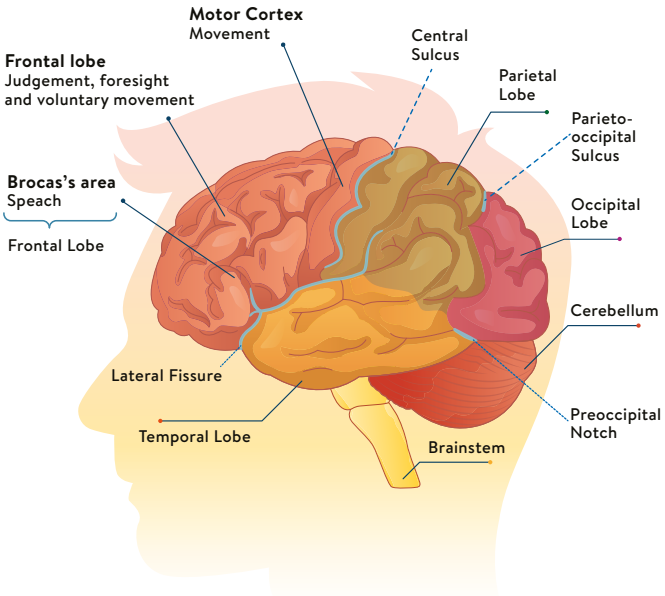


Figure 2.3.16: The location of Broca's Area within the Frontal Lobe.

PHINEAS GAGE

Phineas Gage could easily be considered the most famous patient in the history of neuroscience. He was an American railway worker, who his doctor described as 'a perfectly healthy, strong and active young man with a pleasant temperament…'

Gage's energy, intelligence and strong problem-solving skills led to his appointment as foreman on a railway project in 1848. His primary responsibility was that of 'blasting' – the removal of rock using explosives, to make way for the railway line.

Gage had designed a long metal rod, called a tamping iron, which allowed him to set the explosive charge from a distance, and pack sand over the top of the dynamite to somewhat dampen the blast. It looked something like a javelin.

On September 13, 1848, Gage was distracted by other railway workers while setting the charge for the explosive material. His head was directly in-line with the blast location. When the detonation occurred, the tamping iron was blown upwards, entering the left side of Gage's face, through his cheek. The rod moved diagonally through the head, behind the left eye, and exiting though the skull through the frontal lobe. The tamping iron landed 25 meters away.

The force of his injury caused Gage to be thrown onto the ground and suffer seizures. However, within minutes he was able to speak and walk with some assistance. Gage was put into a wooden cart drawn by an ox and sat upright during the bumpy 1.2-kilometre journey to fetch help.

Upon presentation to the doctor, Gage was conscious and didn't appear to be suffering from immense pain. He recognised the physician and spoke coherently with him. This was despite the doctor having to remove numerous bone fragments from the wound and noting that a portion of brain was protruding through the hole left by the tamping iron.

Despite the lack of serious symptoms experienced by Gage immediately after his injury, his recovery was slow and spasmodic. He went through periods of delirium, an altered state of consciousness, where his behaviour was irrational and childlike. Gage also suffered weakness in some parts of his body, and experienced poor memory.

However, after approximately a month of rest, Phineas Gage was able to walk and talk, with many mental functions returning. 10 weeks after his injury, Gage was able to complete basic tasks around his parent's farm, such as feeding the cattle and ploughing the fields.

Incredibly, despite the severity of his injuries, and a damaged frontal lobe, Phineas Gage lived for another 12 years after the tamping iron pierced his brain. He died in 1860 after experiencing a series of convulsions. Epilepsy was recorded as his cause of death.

Gage's skull and the tamping iron that caused his injury were donated to the Warren Anatomical Museum owned by Harvard Medical School. They are still on display to this day.

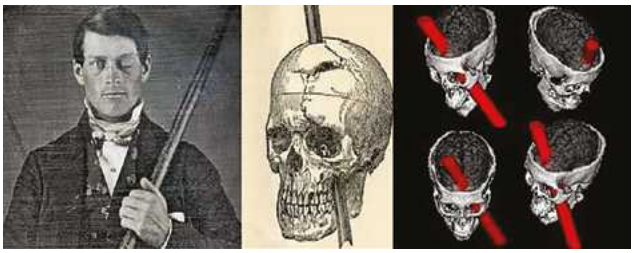


Figure 2.3.17: Phineas Gage holding his tamping iron and the location of his injury.

HELPFUL ONLINE RESOURCES

Watch the story of Phineas Gage.
https://tinyurl.com/hefdebd5

POST-TRAUMATIC STRESS DISORDER

Post-Traumatic Stress Disorder (PTSD) is a form of anxiety and a serious mental health issue. It is commonly experienced in soldiers returning from war but can be suffered by any individual who has lived through a traumatic event. Other examples include natural disasters, terrorist attacks, ongoing bullying, and domestic violence. It is estimated that one in 11 people will suffer from PTSD in their lifetime.

Symptoms of PTSD include flashbacks, nightmares and crippling anxiety. Sufferers may also experience anger and fear, as well as detachment in their social relationships. There are four key categories of symptoms that are considered when reaching a diagnosis of PTSD.

Intrusion refers to experiencing intrusive thoughts which can occur through flashbacks, involuntary memories and traumatic dreams. These flashbacks can be so vivid that it feels to the sufferer as if they are re-living the original trauma, triggering the amygdala to initiate the fight or flight response. This can lead to ongoing heightened levels of arousal which are both exhausting and damaging to the body.

Many sufferers of PTSD demonstrate avoidance, which refers to purposefully avoiding people, places, events or situations that remind them of the trauma they experienced. They do this to reduce the likelihood of experiencing distressing memories, or a panic-induced fight or flight response.

Sufferers also experience alterations in their mood and cognition. One of these changes is a distortion in thinking, causing the sufferer to experience a negative bias in their beliefs about themselves. This can lead to guilt, blame, anger or shame.

Changes in the way the body and brain become aroused also cause PTSD sufferers to experience irritability and angry outbursts, which can manifest in reckless or self-destructive behaviour. It can also cause difficulty sleeping, paranoia and hypervigilance.

There are a number of regions within the brain that contribute to the post-traumatic stress response. Sufferers of PTSD tend to have an overactive amygdala, the area of the temporal lobe that signals the body that a threat is being encountered, and a panic response is necessary. In healthy people, the role of the prefrontal cortex is to regulate emotional responses and determine when the amygdala initiates an unnecessary response. In sufferers of PTSD, the prefrontal cortex does not prevent an unnecessary fight or flight response from occurring.

When an overactive amygdala cannot be controlled by an efficient prefrontal cortex, the brain is able to fire the messages needed to activate a state of hyperarousal in the body. This causes the aforementioned symptoms of flashbacks, paranoia and the inability to relax.

As the memory centre of the brain, the hippocampus also plays a role in the symptoms experienced in sufferers of PTSD. The hippocampus works to make sense of memories and store them accurately. However, when the memories are traumatic, the hippocampus can struggle to process them effectively, leading to the symptoms of feeling overwhelmed, overthinking the event and experiencing feelings of guilt or shame in the way the situation was handled.

POST-TRAUMATIC STRESS DISORDER

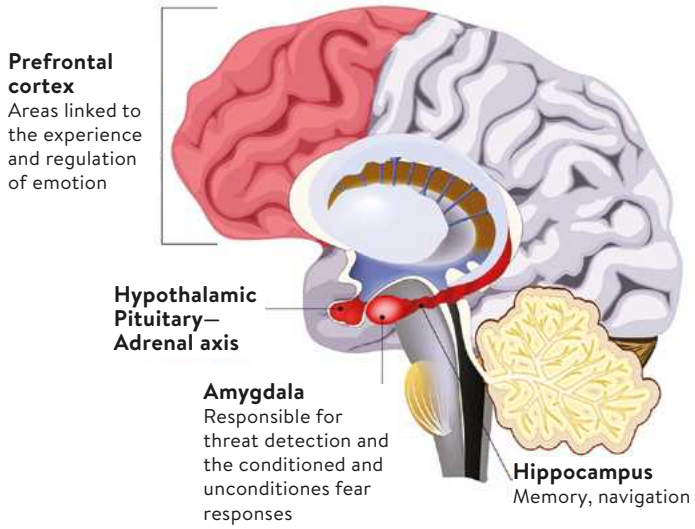


Figure 2.3.18: Regions of the brain affected by PTSD.

CHECKING FOR UNDERSTANDING

1. After the iron rod was shot through his head, Phineas Gage experienced

a. Difficulties interacting with others.
b. Poor memory.
c. Emotional changes.
d. All of the above.

2. The biggest lobe of the brain is

a. The Frontal Lobe.
b. The Parietal Lobe.
c. The Occipital Lobe.
d. The Temporal Lobe.

3. If a stroke is caused by a blood clot in the left hemisphere of the brain

a. The left side of the body will be affected.
b. The right side of the body will be affected.
c. Both sides of the body will be affected.
d. The body will not be affected.

4. The role of the Motor Cortex is

a. To process information provided by the sense organs.
b. To ensure emotions are controlled.
c. To coordinate muscles and movement.
d. All of the above

5. The role of the Sensory Cortex is

a. To ensure all sense receptors are working properly.
b. To coordinate muscles and movement.
c. To process information provided by the sense organs.
d. To regulate feelings of hunger.

6. The Motor and Sensory Cortexes are located
a. At the base of the brain.
b. Just above the spinal cord.
c. In the midbrain.
d. At the top of the cerebrum.

7. The Cerebral Cortex coordinates
a. Speech.
b. Memory.
c. Cognitive Functions (problem solving)
d. All of the above.

8. The peaks and grooves in the cerebrum are used to
a. Increase the surface area.
b. Increase intelligence levels.
c. Prevent brain injuries from occurring.
d. Separate the lobes.

9. The main role of the Hypothalamus is
a. Consolidating short term memories.
b. Coordinating growth and development.
c. Controlling functions needed for survival.
d. Ensuring your sleep cycle is regulated.

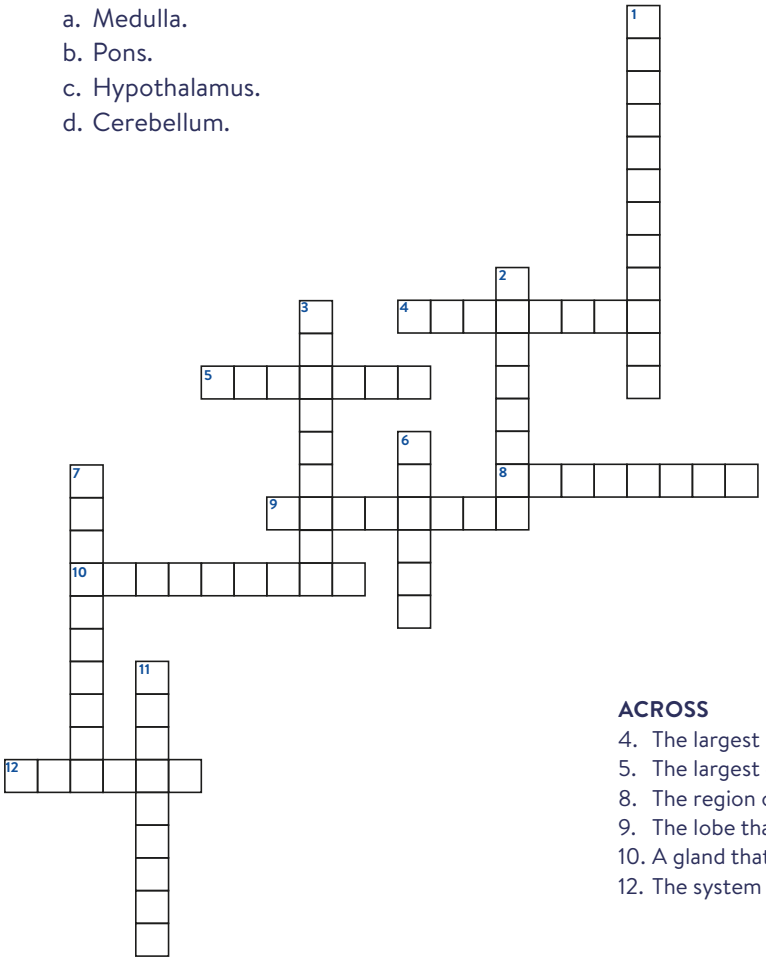
10. Which of the following anatomical structures are NOT part of the hindbrain?
a. Medulla.
b. Pons.
c. Hypothalamus.
d. Cerebellum.

11. The Cerebellum controls
a. Coordination of sensory neurons.
b. Posture and balance.
c. Memory, learning and thinking.
d. Secretion of hormones.

12. Which of the following about the human brain is UNTRUE?
a. It weighs approximately 1.4kg.
b. It is very well developed in mammals.
c. It is surrounded by fluid inside the skull.
d. It is smaller in people with a low IQ

13. Homeostasis is
a. Regulation of the body's internal environment.
b. Choosing to fight rather than flight.
c. The result of a spinal cord injury.
d. Controlled by the sympathetic nervous system.

14. A homunculus represents
a. The function of the cerebellum.
b. The number of nerves controlling each body part.
c. The size of the cerebrum.
d. The density of nerves in the frontal lobe.



DOWN
1. Controls survival functions.
2. The lobe associated with auditory processing.
3. The region that containts the medulla, pons and cerebellum.
6. The substance lacking in the neurons of MS sufferers.
7. Often referred to as the little brain
11. The lobe that processes visual information.

ACROSS
4. The largest portion of the brain.
5. The largest of the four lobes.
8. The region of the brain associated with anger.
9. The lobe that processes information about touch.
10. A gland that secretes hormones.
12. The system that controls emotions.

CHECKING FOR UNDERSTANDING

15. Which part of the brain is the largest out of the cerebellum and the cerebrum?

..

16. Give two examples of functions that may be affected if the frontal lobe was damaged.

..

17. Explain what the function of the limbic system is.

..

18. During a car accident, Stephen suffered damage to his spine. His spinal cord was severed just above the waist. What symptoms may Stephen experience?

..

..

Jan suffered serious head injuries when she was thrown from a horse. Since the accident she appears to struggle to understand others when they talk to her, and speaks in long, but nonsensical sentences.

19. Which area of Jan's brain is most likely to be damaged?

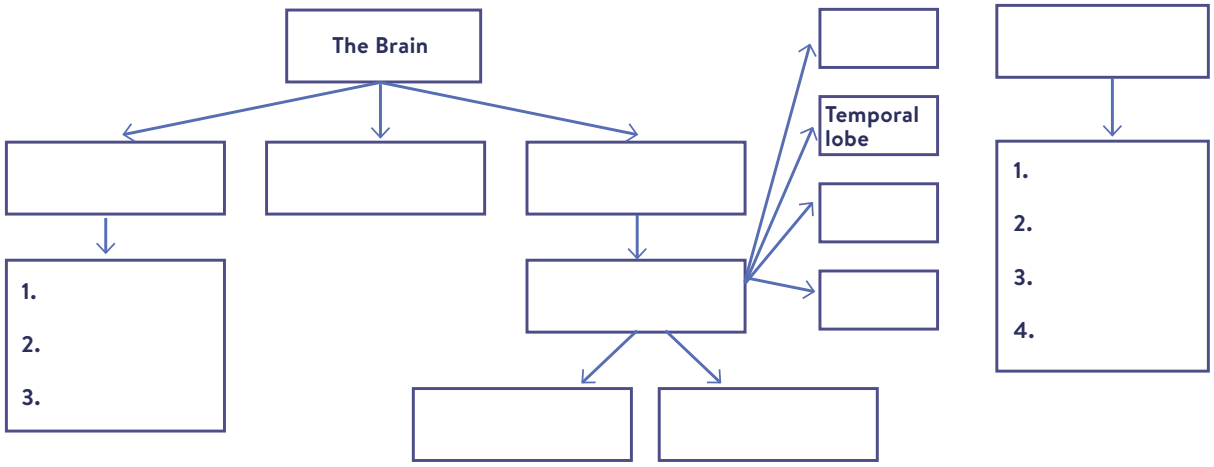
..

20. How does this area of the brain normally function?

..

COMPLETE THE FLOWCHART

Use the following terms: Thalamus, Pons, Parietal Lobe, Limbic System, Hypothalamus, Sensory Cortex, Medulla, Midbrain, Occipital Lobe, Amygdala, Hindbrain, Cerebellum, Cerebrum, Forebrain, Motor Cortex, Hippocampus, Frontal Lobe



HELPFUL ONLINE RESOURCES

Use this website to view a 3D image of each anatomical structure in the brain.
https://tinyurl.com/bdcw7fr2

Use this Quizlet study set to help you revise key vocabulary.
https://tinyurl.com/y3fndwa3

2.4 NEUROTRANSMITTERS

- The nervous system uses various chemicals that contribute to our responses and behaviours.
- Discuss the purpose of neurotransmitters and hormones, such as serotonin, dopamine, oxytocin, cortisol.

2023 Subject Outline | Stage 1

Serotonin

Serotonin is a hormone and neurotransmitter with an inhibitory function. It works to regulate mood, sleep patterns and appetite, as well as contributes to cognitive functions such as learning and memory. The majority of serotonin production occurs within the gastrointestinal tract, where it is absorbed into the bloodstream. Only about 10% of serotonin is produced by the brain. While it is widely believed that a lack of serotonin contributes to depression and anxiety, recent studies have suggested that this is an over-simplification of complex disorders, and serotonin levels do not influence mental health as much as once thought. (Moncrieff. J, 2022).

Despite this recent research, one of the most common methods of treating depression and anxiety is with a medication called Selective Serotonin Reuptake Inhibitors (SSRIs). SSRIs work by increasing the amount of serotonin in the brain by blocking the reuptake into the presynaptic neuron. This allows more serotonin to remain in the synapse, available for neural messaging. SSRIs may also be used to treat conditions other than depression.

Dopamine

Dopamine is a neurotransmitter associated with pleasant feelings, causing sensations of pleasure, motivation and satisfaction. It is secreted by neurons when we expect to receive a reward. The benefit of dopamine is evolutionary – pleasurable feelings are produced after engaging in life-sustaining behaviours such as eating. Having the correct amount of dopamine present in the nervous system is important as it is integral to cognitive functions such as motivation, learning and concentration. Low levels of dopamine can also be linked to mental health disorders such as depression, schizophrenia and addiction.

The area of the brain activated by the release of dopamine is known as the 'reward centre', composed of the ventral tegmental area (VTA), nucleus accumbens (NAc), and substantia nigra (SN).

The process of learning relies on the action of dopamine. It causes behaviours to be repeated when their execution causes the release of dopamine. When humans choose to abuse drugs, such as alcohol, cigarettes,

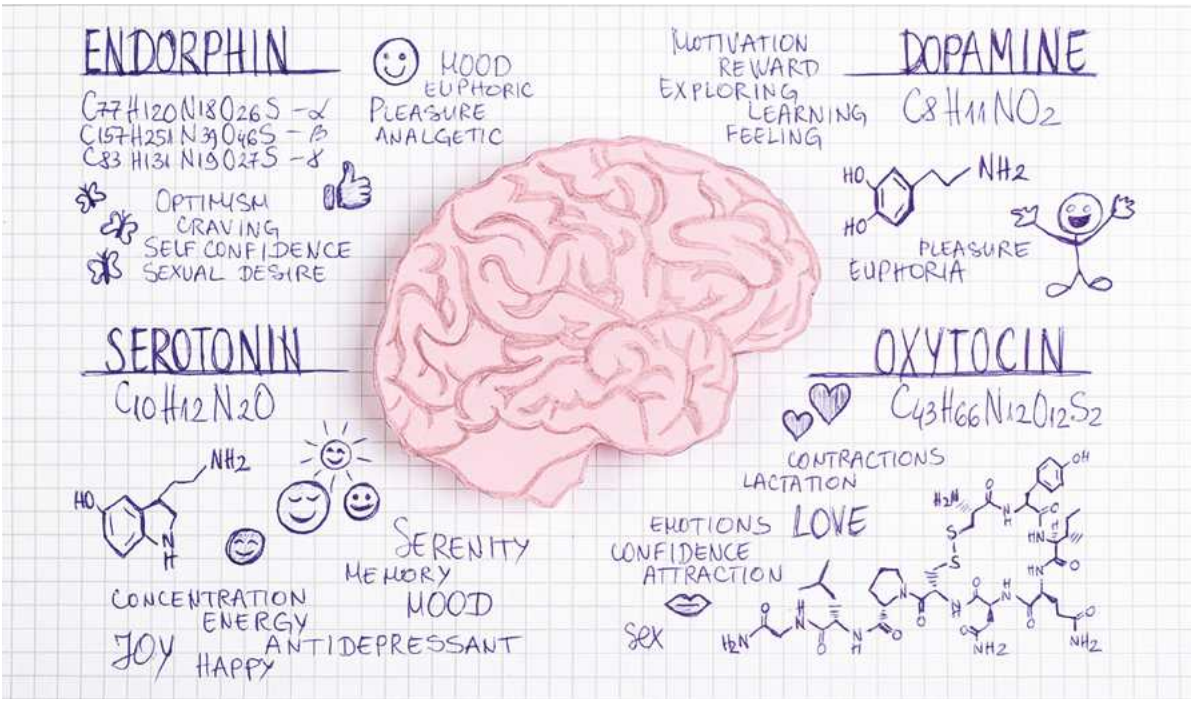


Figure 2.4.1: The actions of common neurotransmitters.

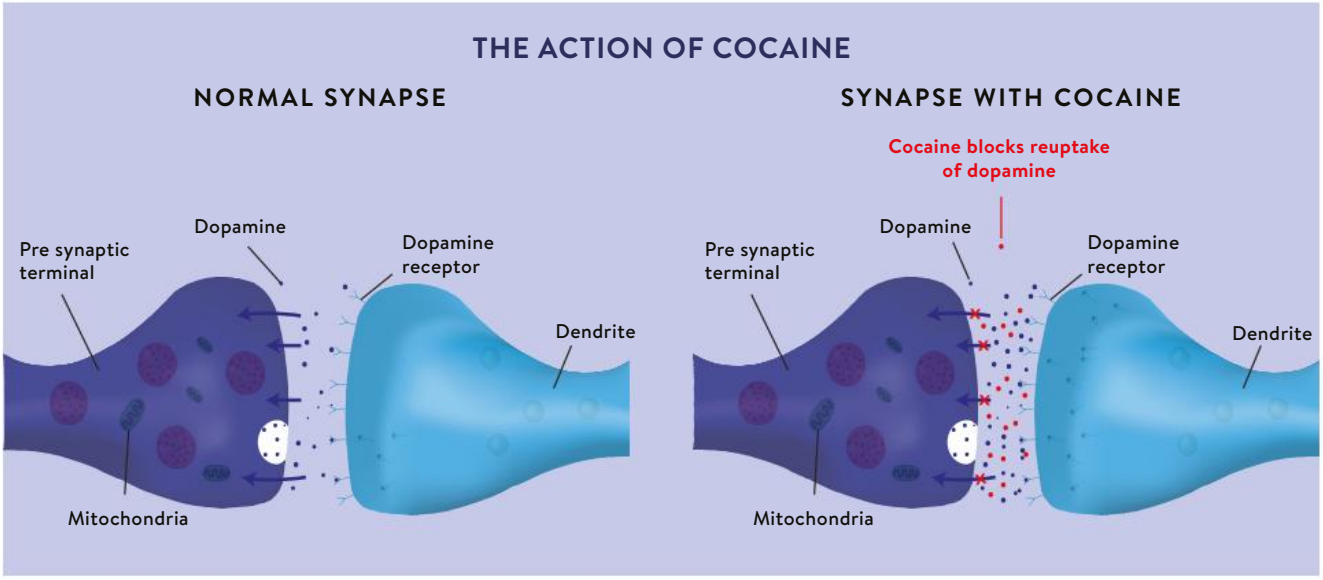


Figure 2.4.2: Cocaine increases the amount of Dopamine in the brain.

methamphetamine and cocaine, very high levels of dopamine act upon the reward centre in the brain. This causes strong feelings of pleasure, which can become addictive. Drug use increases in order to continue experiencing the pleasurable reward of dopamine.

While the ingestion of the aforementioned substances causes dopamine release, it is not necessary to consume a drug in order for addiction to occur. People can become addicted to gambling or playing video games because these behaviours cause the release of dopamine, through experiencing hyperarousal. This process is self-reinforcing, meaning that the experience of dopamine causes an increase in the behaviour that preceded it. When the behaviour is excessive, or has a negative impact on one's daily life, it is considered an addiction.

HELPFUL ONLINE RESOURCES

Listen to Dr Lieberman explain dopamine and how it acts on the brain.
https://tinyurl.com/bdhdjnhy

Oxytocin

Oxytocin is commonly known as the 'love' hormone. It acts as a neurotransmitter in the brain, released from the pituitary gland. Oxytocin is associated with childbirth and breastfeeding as it is secreted during labour and lactation. As well as assisting with the widening of the cervix during the birthing process, oxytocin also has social functions. Oxytocin is released during sex, or when we cuddle or bond with a loved one. It contributes to pro-social behaviours, emotions including trust, relaxation and empathy, and the formation of positive memories. As it is released during breast-feeding, it assists in the development of attachment between a mother and child. Together with serotonin and dopamine, oxytocin has a powerful impact on mood. It has also been found to reduce the stress response.

Researchers have found that levels of oxytocin are generally higher in people enjoying a relationship with a partner. This suggests the oxytocinergic system is more active during the early stages of romantic attachment. (Schneiderman. I, et. al, 2012)

While females typically have higher levels of oxytocin, several studies have found that in men, oxytocin improves the ability to identify competitive relationships and navigate their fight or flight response. It also regulates the production of testosterone and sperm.

HELPFUL ONLINE RESOURCES

Watch this Catalyst episode all about oxytocin.
https://tinyurl.com/2zttayyn

While having lower than normal levels of oxytocin is rare, this can occur if the pituitary gland is not functioning properly. It has been suggested that low levels of oxytocin may be linked to autism, however, recent studies failed to prove a correlation (Sikich. L, et. al, 2021) However, because oxytocin enhances feelings of connection and assists in how relationships are formed and maintained, lower levels may cause poor social functioning. A deficit in oxytocin has also been linked to depressive disorders; however, the use of synthetic oxytocin in treating depression and anxiety was inconclusive. (De Cagna. F, et. al, 2019).

Cortisol

Cortisol is a steroid hormone secreted by the adrenal glands. Together with adrenaline, cortisol plays a vital role in the fight or flight response, preparing the body to deal with threat. It helps to maintain blood pressure, immune function and the body's anti-inflammatory processes. Cortisol is produced in response to stress, which means that high levels of arousal, or extended periods of perceived threat, cause high levels of cortisol in the bloodstream. Chronic stress refers to the feeling of being overwhelmed and pressured over a long period of time. Our fight or flight response, and therefore the secretion of cortisol, is designed to deal with short-term threat, which is resolved quickly. However, our modern lifestyle has caused chronic stress to be experienced as a result of the ongoing perception of threat, possibly caused by career demands, financial worries, or relationship issues. Factors like these are not life-threatening; however, they are unlikely to be remedied by a brief fight or flight response. Therefore, the stress experienced is prolonged, forcing the body to release high levels of cortisol.

While adrenaline is quickly metabolised out of the blood after a short impact on the sympathetic nervous system, cortisol remains in the bloodstream. Increased levels of cortisol have been linked to digestive problems, heart disease and diabetes, as well as adrenal fatigue, which affects sleep, mood and memory.

HELPFUL ONLINE RESOURCES

Watch this short video about how stress affects the brain.
https://tinyurl.com/4fyz2zpx

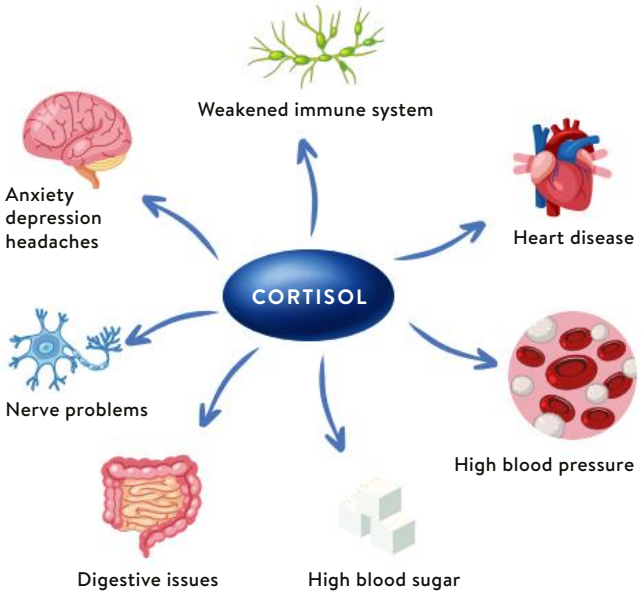


Figure 2.4.3: Increased levels of cortisol have negative effects on the body.

Cortisol also has a detrimental effect on many functions of the brain. One such impact is that cortisol depletes levels of Brain-Derived Neurotrophic Factor (BDNF). BDNF creates neurons and maintains the health of existing brain cells. Lowered BDNF levels have been linked to depression, Alzheimer's Disease and dementia. Cortisol also enlarges the amygdala, the area of the brain that controls emotion. An enlarged amygdala increases levels of anxiety and fear, which in turn causes even higher levels of cortisol production.

Cortisol also damages the receptor sites of previously mentioned neurotransmitters serotonin and dopamine, reducing levels of these vital hormones in the brain.

Synthetic corticosteroids that mimic the function of cortisol, such as prednisone, are prescribed to patients to treat inflammation and to suppress the immune system. However, Savas et. al (2020) determined that corticosteroid use was correlated with higher prevalence of mood and anxiety disorders.

SOCIAL MEDIA AND THE BRAIN

It has been known for some time that excessive use of social media and technology such as computer games is linked to poor mental health. A 2020 review conducted by Fazida Karim and colleagues of over 50 studies into this topic concluded that social media are responsible for aggravating mental health problems. Key findings were that social media use is increasing, especially in young people, leading to a more sedentary lifestyle and limited face-to-face interactions. A lack of physical activity and decreased social interaction are both risk factors for depression and anxiety. However, the direct relationship between use of technology and the brain is only recently being elucidated.

Social media is reducing our attention spans. Not only do users have the ability to constantly refresh their feed, or scroll past posts they do not find entertaining, but the constant presence of a mobile phone or device allows for distraction when other tasks in life are boring or monotonous. For example, have you ever checked Facebook while waiting for your toast to pop? Or scrolled through Instagram at the bus stop? This instant gratification does not allow the brain to feel momentarily bored and changes the way it seeks pleasure.

When devices are used to entertain us, when desirable content is viewed, or when a notification pings on our screen, the reward centre of the brain, the nucleus accumbens, is stimulated. This causes the brain to secrete dopamine, a hormone associated

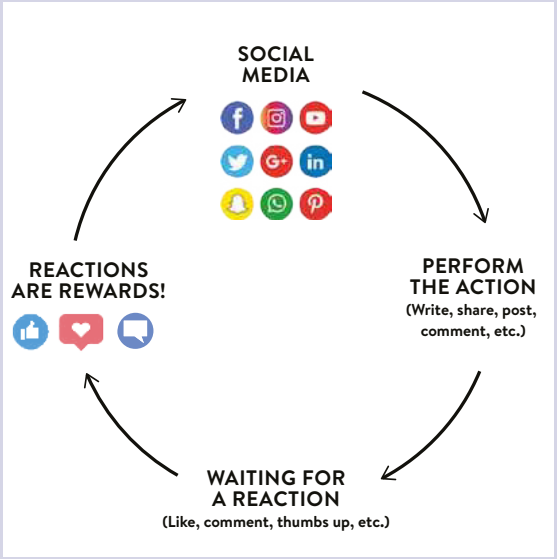


Figure 2.4.4: Use of social media causes a release of Dopamine which encourages the behaviour to be repeated.

with pleasure, reward, and motivation, to repeat the behaviour that caused it to be released. The continued engagement in social media to elicit the continued secretion of dopamine can lead to addiction.

Teenagers are particularly susceptible to the need for admiration from their peers, as receptors for dopamine and oxytocin more than double in the brain during the early stages of adolescence, and are activated during social rewards, such as an online comment, like or notification. Adults do not rely as heavily on social media for these purposes as their sense of self has somewhat matured and a fully developed prefrontal cortex allows for more effective emotional regulation.

Additionally, studies have found that adolescents are finding it more and more difficult to focus on tasks that require time and concentration, due to the instantaneous nature of social media. Much of the information presented online is designed to be skimmed, with many consumers admitting to not reading past the headline of a news article. Due to this, it is suggested that humans only have an 8-second attention span when reading or interacting online. Studies have shown that 10% of children have difficulties with attention by the age of 7. While a shortened attention span and high levels of distractibility do not sound serious, they have been linked to significant conditions and disorders such as poor diet, lack of exercise, depression and attention deficit hyperactivity disorder (ADHD).

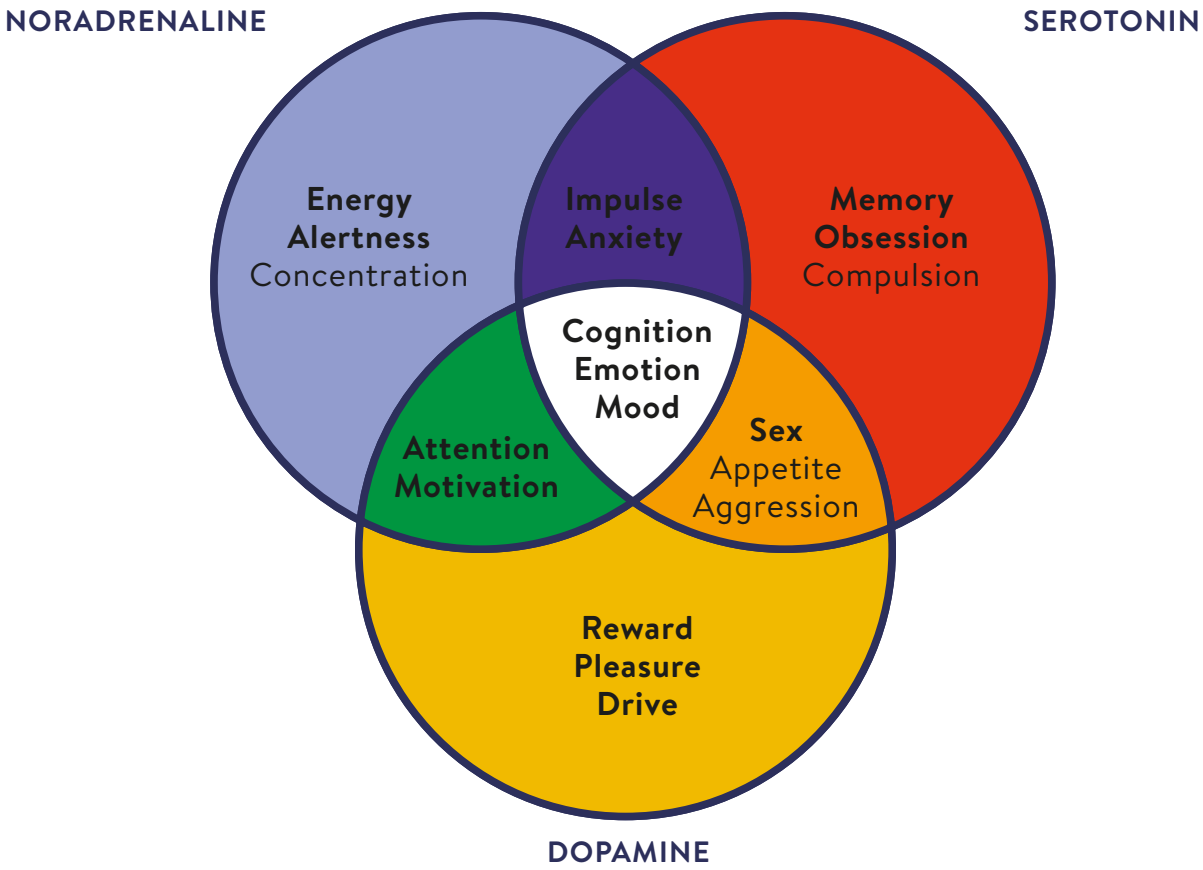
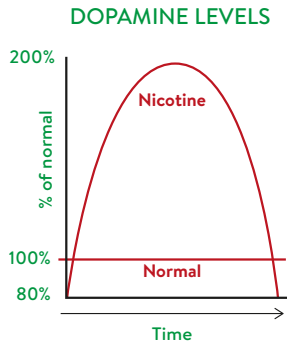


Figure 2.4.5: Emotions and mental health issues can be caused by combinations of hormones.

CHECKING FOR UNDERSTANDING

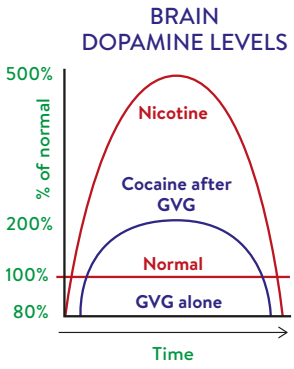
Introducing drugs into your body affects the Nervous System. Drugs can 'fool' your brain into releasing a 'pleasure' chemical called **Dopamine.** Addiction occurs because the body wants more and more Dopamine on a regular basis.

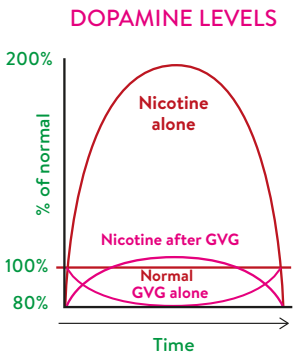
Consider the graph shown below: **1. Explain what this graph shows.**



Dopamine has been described as the "feel-good" neurotransmitter. That's because drugs like nicotine and cocaine cause a pleasurable or "high" feeling by keeping dopamine molecules from re-entering their home cells and thus creating floods of dopamine in the brain. This pleasurable reaction is crucial to the process by which nicotine and cocaine addiction starts.

Gamma-Vinyl GABA (GVG) increases the amount of the brain's most common neurotransmitter, called GABA, and enables better communication among brain cells. **GABA** reduces the level of dopamine in the region of the brain that's involved in addiction to nicotine, cocaine and other substances.





2. By how many percent does cocaine increase the levels of Dopamine in the brain?

3. GVG is a synthetic (man-made) chemical. Would it be helpful to always have levels of GVG in the blood stream? Explain your answer.

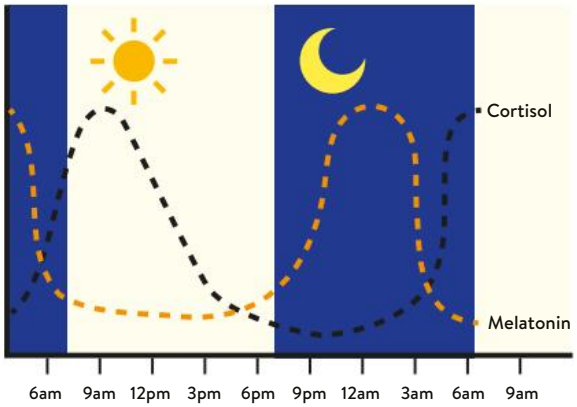
4. Consider the second graph. What do you notice about where dopamine levels begin and end in nicotine users?

CHECKING FOR UNDERSTANDING

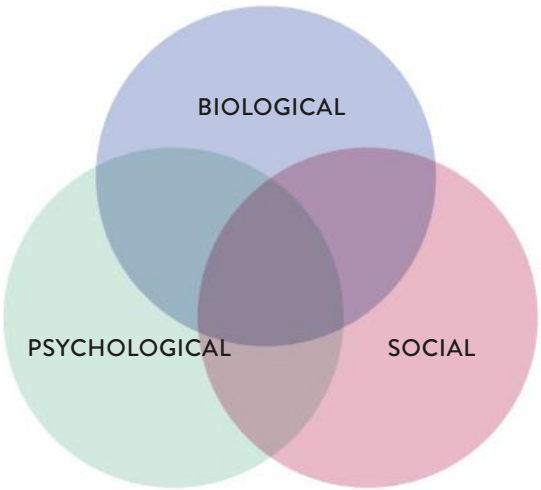
5. Draw a fully labelled diagram of a synapse demonstrating how SSRIs work to increase levels of serotonin.

6. Explain the function of the hormone Oxytocin.

7. Consider the graph shown that represents the hormones cortisol and melatonin. Describe the patterns of their levels in the body throughout a 24-hour period.



8. Complete the diagram below by filling in biopsychosocial influences on the problematic use of social media in teenagers.



2.5 THE BIOLOGICAL BASIS OF MENTAL ILLNESS

- Mental illnesses (such as depression and anxiety) may have a biological basis and can, in some cases, benefit from biologically based treatments and management techniques.

2023 Subject Outline | Stage 1

Biological causes of depression

Depression is a common mental health issue that has been studied for decades in an attempt to determine risk factors and causes. It is defined as a mental health disorder characterised by persistently depressed mood or loss of interest in activities, causing significant impairment in daily life. (Daniel K. Hall-Flavin, 2017) The complexity of the disorder, and the breadth of influences on mood and how emotions are experienced, has meant that a definitive conclusion on the cause of depression has not been reached.

Instead, researchers have suggested that depression has many potential causes, that impact individuals in different ways. It is essential that the **Biopsychosocial model** is used to consider the psychological and social factors, as well as the biological ones, that play into the experience of this mental health issue.

Biologically, it is known that having a parent with depression increases your risk. While the prevalence of depression in the population is 10%, the chance of experiencing it rises to over 20% if a first-degree relative suffers.

Twin studies are often used when seeking to understand the link between depression and genetics. Monozygotic twins share 100% of their DNA. Therefore, if one twin suffers from depression, and depression was purely genetic, the other twin should also suffer. However, this was only found 40-50% of the time, leading scientists to conclude that, while there are genes that contribute to the likelihood of experiencing depression, psychological or social factors contribute to the cause equally.

A study conducted by F. Lohoff in 2010 investigated the role of genetic factors in the development of **Major Depressive Disorder** (MDD). His research concluded that there is no single gene attributed to the experience of depression, because no single gene could elicit such a significant effect. However, Lohoff did suggest that genes of particular interest were the Serotonin Transporter and Serotonin Receptor genes, as they are directly impacted by the use of SSRIs, used to treat depression.

The same study discussed the evidence for a substance known as **Brain Derived Neurotrophic Factor** (BDNF), a protein produced in the brain and spinal cord. BDNF is essential for the growth and development of neurons and contributes to the repair of damaged cells. It is also involved in the process of synaptic plasticity, which refers to the ability of the brain to change and adapt to new information by strengthening or weakening the activity of synapses. Animal studies have also suggested that BDNF has a role in mood disorders, with stress causing decreased levels in the brain, and increased levels being seen in users of antidepressants.

The brain structures implicated in the experience of clinical depression are those that comprise the limbic system, namely the amygdala, thalamus and hippocampus. Both structural and functional abnormalities in these areas have been found in depression, especially a reduction in size. A decrease in grey matter in the hippocampus causes a reduction in function and the experience of negative emotions. The amygdala becomes hyperactive in sufferers of depression, due to the prefrontal cortex's inability to effectively regulate its function. This leads to an increase in negative thoughts and beliefs about oneself and the world around them.

Additionally, the **Nucleus Accumbens** has been suggested to contribute to the experience of depression when it is not effectively regulating the secretion of dopamine and serotonin in the brain. Trauma to the frontal lobe has also been linked to depression, due to the frontal lobe playing such an important role in the control of emotion and behaviour.

Perhaps the most widely recognised biological cause of depression is a lack of the neurotransmitter serotonin. Recent scientific research has suggested that its role in depression is not as significant as once believed; however, antidepressant medication that directly acts upon serotoninergic receptors is still widely used by sufferers of both depression and anxiety.

Biological causes of anxiety

Anxiety disorders also have a biological basis, but again, should be diagnosed and treated only after considering psychological and social influences on a patient's wellbeing simultaneously.

Anxiety as a disorder is characterised by high levels of arousal, worrisome thoughts and feelings of tension, often without a logical trigger. This should not be confused with the natural and healthy emotion of anxiety, which is the body's normal response to stress, and vital in informing the brain about threat.

Consider the rides that you may choose to go on at the Adelaide Show. Logically, you know that they are usually safe – you are strapped in tight, and your seat has a harness locked in place across your body. However, as your body moves at great speed, twisting, turning and even going upside-down, your brain perceives the situation as threatening, causing the 'thrill' of adrenaline secretion, an increase in heartrate and possible shakiness when the ride is over. Some people get addicted to the 'rush' they feel by putting themselves in situations which could be somewhat dangerous – the term 'thrill seeker' or 'adrenaline junkie' is used to describe them, and usually relates to someone who engages in extreme sports such as skydiving, base jumping or white-water rafting.

Figure 2.5.1: Scary show rides cause secretion of adrenaline.

In sufferers of anxiety, the perception of threat is constant, or triggered by situations that do not require a fight or flight response. The biological reaction initiated by the body can be extreme, causing a raised heart rate, increased blood pressure and difficulty breathing. These symptoms can become so severe they constitute a 'panic attack'. A panic attack is a brief episode of intense fear, that causes the sympathetic nervous system to respond forcefully to the point where the sufferer feels a loss of control. The symptoms of a panic attack have been likened to those of a heart attack, therefore causing the sufferer to become even more anxious, and the body even more physiologically aroused.

Even if an anxiety disorder does not manifest itself biologically as a panic attack, it still causes heightened levels of arousal within the body and brain, which can be exhausting and debilitating over time. If the parasympathetic nervous system cannot regain control, and arousal levels remain high for extended periods of time, other health complications can occur. Heart disease, diabetes and insomnia are all linked to ongoing anxiety.

Figure 2.5.2: Breathing exercises are often used to calm people suffering from panic attacks.

Biological treatment options

MEDICATION

There are a number of treatments available to address the biological causes of depression and anxiety.

The most commonly used biological treatment is that of antidepressant medication, which can be used to treat both depression and anxiety. Selective Serotonin Reuptake Inhibitors (SSRIs) work by increasing the amount of serotonin in the brain by blocking the reuptake into the presynaptic neuron. This allows more serotonin to remain in the synapse, available for neural messaging. Common examples of SSRI antidepressants in Australia include Lexapro, Citalopram and Zoloft. SSRIs can cause some minor side effects including nausea, drowsiness and muscle weakness, but these medications are generally very effective in relieving the symptoms of depression and anxiety.

Figure 2.5.3: Citalopram is a common SSRI medication.

Another class of drugs called Benzodiazepines are also used to treat anxiety. They are sedatives that help calm the mind and relax the muscles, by increasing the action of the neurotransmitter GABA. This has a sedating effect. Benzodiazepines are not usually used as a long-term treatment for anxiety. They are useful for controlling the symptoms of a panic attack and are generally used as a 'one-off' dose, or only for a very short time frame. They lose their effectiveness if taken every day, or for a long period of time, because the brain becomes used to their effects. Benzodiazepines are not suitable for children, or sufferers of lung disease or sleep apnoea. They are also not recommended in pregnant or breast-feeding women.

Side effects of benzodiazepines may include drowsiness, confusion, memory problems, muscle weakness, constipation and nausea.

ELECTROCONVULSIVE THERAPY

Much less commonly used to treat depression is a procedure called Electroconvulsive Therapy (ECT). ECT is conducted under general anaesthetic. An electrical current is passed through the brain in order to trigger a brief seizure. ECT is only used when other treatments for depression have not been successful, and the patient is at risk of self-harm.

When undertaking ECT, a general anaesthetic is delivered to the patient, causing them to become unconscious for between 5-10 minutes. They are also given a muscle relaxant to prevent excessive movement during the treatment.

A well-controlled and brief electrical current is delivered to the patient's brain, through electrodes placed on the temples of the head. If you were observing the process occur, you would notice the toes of the patient twitching when the electrical current was delivered. The electricity causes a small seizure to occur in the cerebrum of the brain. There is no pain involved in the process, other than the injection needed to deliver the anaesthetic.

In the brain, the delivery of electricity causes a significant increase in activity. The medical team monitor this through a machine called an electroencephalogram (EEG) which records electrical activity in the brain.

HELPFUL ONLINE RESOURCES

Watch this video which demonstrates the process of ECT.
https://tinyurl.com/3rre6j44

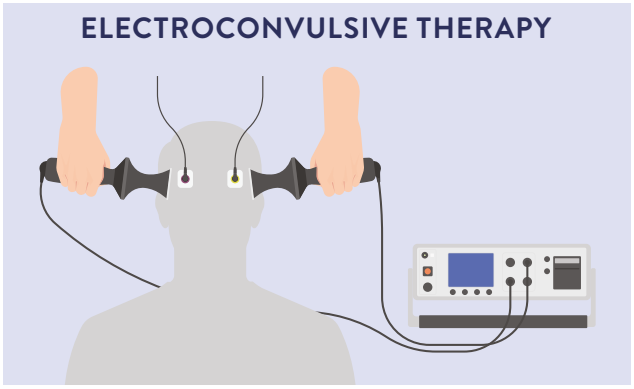


Figure 2.5.4: ECT involves an electrical impulse being passed through the brain.

Most patients require a number of ECT sessions before significant changes in their mood are experienced. It is common for patients to engage in between 6-12 sessions, given 2-3 times weekly. They are able to return to normal activities within hours of the procedure, and the side effects are minimal.

Most of the risk associated with ECT comes from the need for a general anaesthetic, rather than the process itself. General anaesthetics are also known to be safe and well controlled, but each time anaesthesia is delivered, there is a small chance of complications arising. Symptoms associated with the delivery of electricity to the brain include short-term confusion, muscle aches and possible memory loss.

It is not completely understood how ECT influences the brain. Researchers at Johns Hopkins University discovered that ECT caused new brain cells to grow in the hippocampus, leading to the development of dendrites and thus a greater number of connections between neurons that regulate emotions.

Extensive research has proven ECT to be highly effective in treating depression, showing a significant improvement in over 80% of patients who have not responded to medication or psychotherapy.

DEEP BRAIN STIMULATION

Applying a controlled dose of electricity to the brain is also the premise of a newer treatment option, Deep Brain Stimulation (DBS). Similar to ECT, DBS is only utilised when more conservative treatment options such as therapy and medication are unsuccessful.

DBS involves implanting semi-permanent electrodes into the brain, which are capable of delivering electrical impulses to regulate abnormal signals created by neurons, much like pacemakers used in the heart. Patients are able to control the impulses created by the electrode using a small remote control.

Currently, DBS is used for sufferers of movement disorders, like Parkinson's disease and epilepsy. The thalamus or basal ganglia are usually the site of the stimulation for movement disorders, leading to a reduction in tremors. Research is continuing into its efficacy as a treatment option for depression. In some countries, it is already being used to treat Obsessive Compulsive Disorder (OCD) which is a type of anxiety.

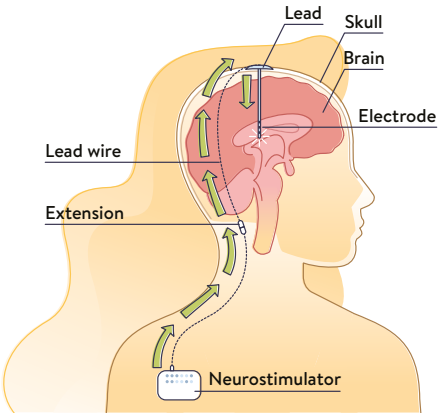


Figure 2.5.6: DBS involves implanting electrodes into the brain that deliver electrical impulses.

OPTOGENETICS

Optogenetics refers to the medical technique of using light to control neuronal activity. It was chosen as the 'Method of the Year' in 2010 by Nature Methods, a scientific research journal.

A number of scientists have contributed to the field of Optogenetics over the last 50 years. Francis Crick, known for his work with DNA, was among the first scientists to suggest that individual neurons within the brain may be controlled using light, leaving the rest unaltered. Throughout the 1990s, a number of researchers experienced success in the use of light in gene expression controlling neuronal activity.

Optogenetics uses genetic engineering to insert DNA sequences into genes of interest that cause neurons to produce special proteins called Opsins. Opsins occur naturally and were first discovered in algae. They respond to light, and, when inserted into neurons, also cause the neuron itself to become activated when light is present. This allows scientists to have precise control over the activity of the neuron using light. Only the neurons that have had the DNA code for Opsins inserted will respond.

Optogenetics have been has proven effective in the treatment of anxiety. It holds an advantage over ECT and DBS because of the specificity with which it can target neurons and their pathways. A 2011 study by Tye. K, et. al. found that the use of optogenetics in activating neurons in the amygdala had a calming effect on anxiety patients.

As with all psychological treatments, ethical considerations, limitations and disadvantages to optogenetics must be considered without bias. While the procedure holds obvious potential in treating a range of mental and physical health issues, the process inevitably requires an invasive and permanent genetic change to DNA sequencing and the internal structure of neurons. Because of this, it is vital that the potential benefit of optogenetics in treating a disorder is weighed up against potential side effects, such as unintentional activation of the genetically modified neurons and their pathways.

It is a common scientific understanding that there is still much to learn about the root causes of both depression and anxiety. As mentioned in this chapter, there are numerous biological influences on both of these mental health issues, including brain structures, neuronal function and the level of neurotransmitters present. Genetics also play a role, as does the environment and the personal experiences of the sufferer. Due to this level of complexity, it could be asked whether neuronal activation through optogenetics should be marketed as a treatment option when so many other elements of mental health are not addressed.

CHECKING FOR UNDERSTANDING

1. **State three brain structures impacted by depression.**

2. **Suggest two reasons why medication is commonly used to treat anxiety and depression.**

3. **Explain when ECT may be used as a treatment option.**

4. **Suggest why optogenetics is considered by some to be an unethical treatment option.**

2.6 ETHICAL CONSIDERATIONS OF NEUROPSYCHOLOGICAL RESEARCH

- Conducting research in neuropsychology can be ethically challenging and can also result in a variety of outcomes that may be ethically or morally ambiguous.

2023 Subject Outline | Stage 1

Ethical considerations in neuropsychology

Conducting research in neuropsychology can be fraught with ethical considerations. The brain is not only a mass of tissue but considered by many to be the part of the body that determines who they are – their identity, intelligence, sense of self and personality. As such, there can be apprehension in patients considering both psychological and physical treatment options.

Many of the treatment options discussed above are based on relatively recent findings, especially those that rely on DNA and genetic research. Long term side effects and limitations of these treatments may not yet be apparent in patients that have undertaken them. We simply don't know how DBS and optogenetics will impact the long-term functioning of the brain, and this must be considered by those choosing them as a treatment option. Physicians recommending these procedures must also be open and honest about the potential risks, explaining that many of these are unknown.

Another ethical consideration is the likelihood of treatment success. While invasive treatments for depression, anxiety and movement disorders are often life-changing, there are always patients who do not experience the same level of benefit. In these cases, sufferers have undergone intrusive and potentially risky procedures without an improvement in symptoms. It is understandable that patients may pin their hopes on the success of either surgery or medication, and the failure to relieve symptoms would be disappointing and possibly exacerbate existing mental health issues.

Many studies have suggested that there are neurological and mental health disorders linked to genetics and heredity. While not conclusive, it is widely accepted that a family history of a certain disorder increases the likelihood of an individual suffering the same complaint. If you knew that you had many family members suffering from Parkinson's disease, and that your chance of also developing the disorder were higher than normal, would you consider pre-emptive intervention? Would you undertake an invasive brain procedure or begin taking medication, not to address the symptoms, but in the hope of reducing your chance of suffering in the future? This is another ethical consideration – should pre-emptive surgeries and procedures be allowed? Would we reach a point where individuals are choosing to undertake a wide range of treatments in an attempt to protect themselves against diseases and disorders they may never be stricken with?

One of the criticisms of optogenetics is that the procedure does not address symptoms of a disorder – instead, it changes the structures within the brain to prime them for treatment success. There is a distinct difference between these two ideas. Rather than a corrective measure, the manipulation of genetic code somewhat enhances the brain. And if this can be done in people suffering from mental and physical health disorders, what is stopping healthy people from utilising the technology to strengthen, enhance or manipulate their own gene expression? Therein lies one of the key ethical considerations with any type of genetic engineering – once the technology begins to be used to alter the human genome, when will it end? There are no definitive answers to what is classed as a disorder and what is not. Would we use genetic engineering to correct something as simple as needing to wear reading glasses? Should unattractive personality traits such as narcissism be eliminated? Is it fair that some people are able to access technology that 'improves' the way their brain functions, making them mentally or physically superior to others? It should also be considered that the cost of some procedures renders them inaccessible to many without health insurance or living in poverty. DBS for Parkinson's disease sufferers is covered by Medicare in Australia but would otherwise cost over $30,000.

While informed consent is required before any neuropsychological procedure is undertaken, extra care should be utilised by physicians when dealing with vulnerable patients. Sufferers of chronic and debilitating disorders may be unable to effectively consider potential limitations or side effects because their desire for treatment is so great. It may be necessary for doctors to allow patients time to process the information they have received, and request that a treatment decision is made at a later date, rather than immediately. Physicians should also take the time to explain the advantages and disadvantages of treatment options clearly and without bias, so that participation is well informed and voluntary.

HELPFUL ONLINE RESOURCES

Watch this clip on the ethics of neuroscience from Monash University.
https://tinyurl.com/4ye4jh3z

CHECKING FOR UNDERSTANDING

Explain how the following ethical guidelines must be considered in neuropsychological research.
See Page 294 in the Science Inquiry Skills chapter.

INFORMED CONSENT

..

..

WITHDRAWAL RIGHTS

..

..

CONFIDENTIALITY

..

..

VOULUNTARY PARTICIPATION

..

..

PSYCHOLOGICAL HARM

..

..

DECEPTION

..

..

PRACTICAL ACTIVITIES: SENSITIVITY OBSERVATION

Aim: To investigate whether touch receptors are evenly distributed in the skin.

Information: When the subject feels two pin pricks from two pins placed 2mm apart, two nerves have been stimulated. This means that the receptors are no more than 2mm apart. Feeling only one pin prick indicates fewer receptors, spaced more widely.

Materials: Cork, Three pins.

Procedure:

1. Push two pins through a cork so that the points are 2mm apart.
2. Push a third pin through in a position that will enable the tester to use the same cork to test the skin with only one pin.

3. Work in pairs to test different surfaces of the body. One student is the tester. The other is the subject.
4. Holding the pins upright, the tester gently touches the skin of the subject, following the criteria in the table below.
5. Test various parts of the body, such as the
   - Back of the hand
   - Palm of the hand
   - Fingertips
   - Upper Arm
   - Back of the neck
6. Mix up the trials – don't do all the single-pin trials first.
7. When the pins touch the skin, the subject should indicate whether they can feel two points or one.
8. Test each part of the body five times, first with one pin and then with two pins.
9. The tester should record the results.
10. The tester and the subject should then swap places.

Pins can hurt! Only press gently on the skin, and make sure you use your pins responsibly!

Results

Body Part	Test 1	Test 2	Test 3	Test 4	Test 5
Back of Hand **One pin**					
Back of Hand **Two pins**					
Palm of Hand **One pin**					
Palm of Hand **Two pins**					
Fingertip **One pin**					
Fingertip **Two pins**					
Upper Arm **One pin**					
Upper Arm **Two pins**					
Back of Neck **One pin**					
Back of Neck **Two pins**					

DISCUSSION QUESTIONS

1. Based on the results collected in the table above, which body parts seem to be more sensitive?

2. Think about the function of the body parts you listed in Question 1. Explain why they may need greater sensitivity than other body parts.

3. Do the results from your experiment correlate to the 'homunculus' theory? Explain.

REACTION TIMES

Aim: To calculate the reaction time for a simple task.

Materials: Metre Ruler

Procedure:

1. Work in pairs.
2. The person being tested (the subject) should sit with their elbow resting on the edge of the table.
3. The other person (the investigator) holds the ruler by the 100cm mark so that it hangs vertically, with the 0cm mark between the thumb and forefinger of the subject.
4. When the investigator releases the ruler, the subject tries to catch it as quickly as possible, using just their thumb and finger. Complete three trials.
5. Record the distance the ruler has fallen and record it in the table below.
6. **Now the subject should close their eyes.** The investigator should tap them on the shoulder at the same time they drop the ruler. The subject should try and catch it in the same way as before. Record the results in the table.
7. The final test should be with the subject's eyes closed, and the investigator saying 'Now' when they drop the ruler. Record the results in the table.

Results:

Sense Used	**Trial 1** (Distance in cm)	**Trial 2** (Distance in cm)	**Trial 3** (Distance in cm)	**Average** (Distance in cm)
Eyesight				
Tactile Sensation				
Hearing				

DISCUSSION QUESTIONS

1. The use of which sense provided you with the fastest reaction time?

2. Explain what is going on in your nervous system, from the time you receive the stimulus to the time you catch the ruler.

PRACTICAL ACTIVITIES: BRAIN DISSECTION

Aim: To dissect an animal brain and identify key anatomical features.

Materials:

- A sheep's brain (preferably with cerebellum attached)
- Newspaper covering your desk.
- A tile on top of the newspaper
- A scalpel blade safely inserted into a blade holder.
- A pair of tweezers
- A probe
- Apron and gloves

HINT: Dissecting the brains while frozen allows for easier scalpel work and identification of features.
1. Look at the brain sitting on your white tile. Draw the side view, labelling the following features:
Brainstem, medulla, pons, cerebellum, cerebrum, frontal lobe.

2. Slice the cerebrum down the centre, separating the two hemispheres. Draw the dissected side view, labelling the following features:
Cerebrum, midbrain, thalamus, cerebellum, pons, medulla, brain stem.

REMEMBER! Scientific drawings should be done in pencil, using bold lines (not sketched) and labelling (no colours or textures).

PRACTICAL ACTIVITIES: BRAIN DISSECTION (cont.)

3. If the brain has a cerebellum, draw a diagram of the cross-section, labelling the white matter and grey matter.

4. Complete the following table:

Structure	Function
Hypothalamus	
Medulla	
Cerebellum	
Thalamus	
Pons	

5. Research the position of the pituitary gland and add it, in a different colour, to your second diagram.

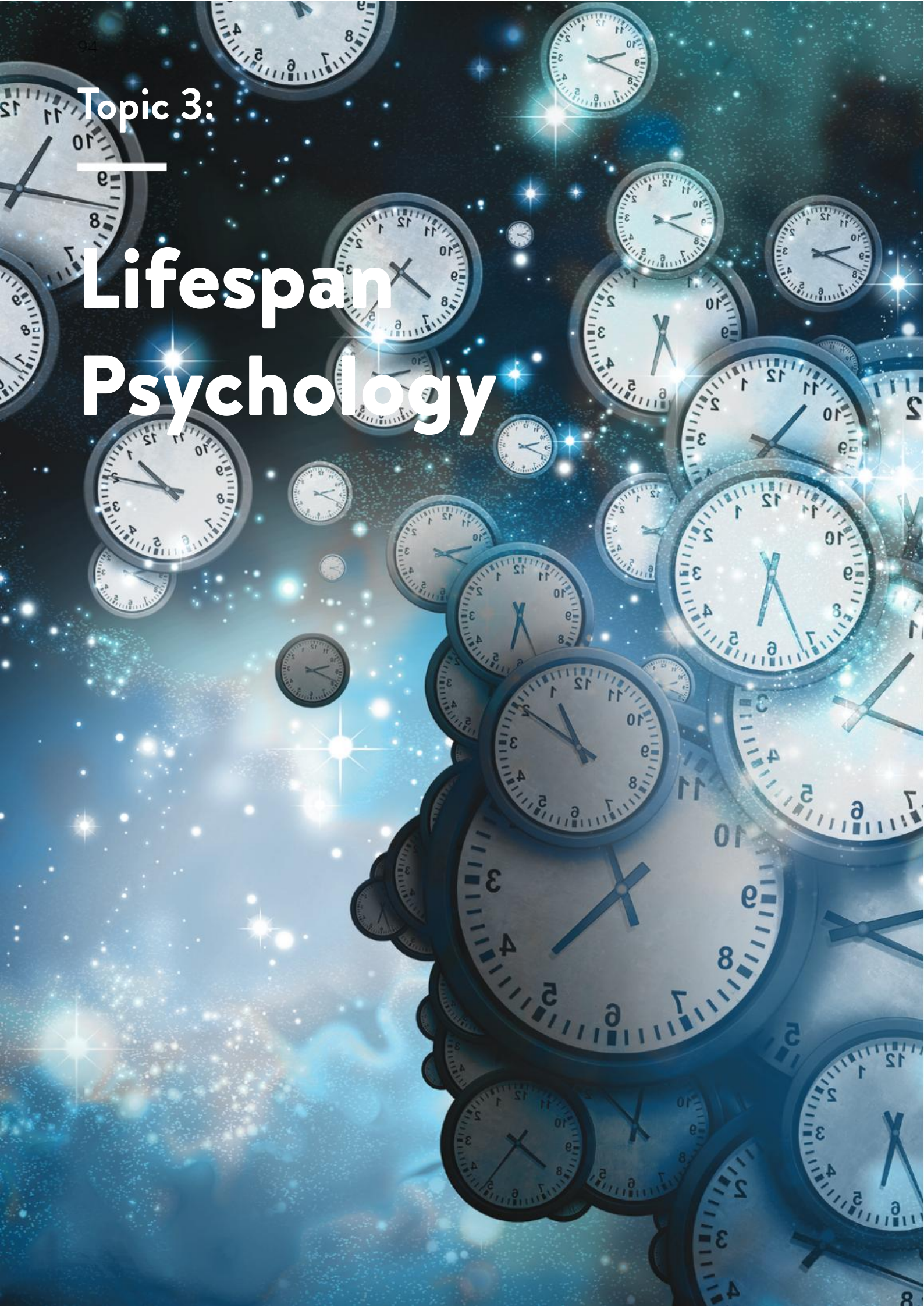
6. Research the position of the corpus callosum and label it in your second diagram.

7. Explain the function of the corpus callosum:

8. Read this New Scientist article about a woman born without a cerebellum. Explain how she was able to live a relatively normal life despite missing this important brain structure. https://tinyurl.com/3t3hsmya

Topic 3:

Lifespan Psychology



3.1 WHAT IS LIFESPAN PSYCHOLOGY?

- Lifespan psychology is the scientific study of the full process of human development from conception to death. It is a holistic approach to understanding all the physiological, cognitive, emotional, and social changes that people go through.
- There are developmental stages across the human lifespan from birth to late adulthood.
- Development is biologically determined over the human lifespan but can be influenced by the environment.
- There are individual differences in the development of humans over their lifespans.

2023 Subject Outline | Stage 1

What is Lifespan Psychology?

Lifespan psychology is exactly what it sounds like, the study of psychological processes, physical abilities and human behaviours across the lifespan, that is, from conception through to death. It includes not only the biological or physical changes, but the cognitive, emotional and social changes that people experience throughout their life. Generally speaking, development is divided into several commonly accepted age-related categories like those in Figure 3.1.1. However, there are many more specific theories of human development that will be outlined in this chapter.

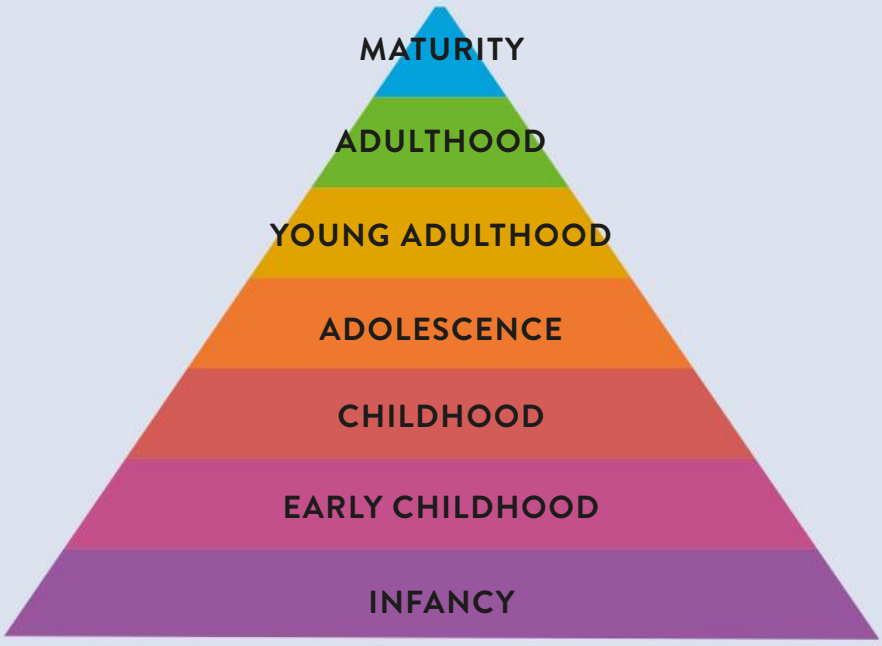


Figure 3.1.1: Categories of developmental stages.

CHANGES ACROSS THE LIFESPAN

As humans grow, not only does their physical body change, but their ability, understanding and capacity to do tasks changes too. These changes can and usually do lead to improvements in people's skills and abilities. For example, when babies grow into toddlers, they develop the ability to walk, or as children get older their ability to hold a pencil improves from thick crayons when they first start, to being able to hold and use pens or stylus'.

Changes can also relate to the way people think. One example of this is the changes that occur as we grow from initially only understanding **concrete ideas**, to understanding more **abstract concepts**. Concrete ideas refer to things that exist in the real world and are tangible, that we can see or touch. Abstract concepts refer to things that you can't see or touch, for example the ideas of morality and ethics. In terms of how this understanding develops across the lifespan, generally a primary school student is able to understand concrete

ideas, for example that 1+1=2, but doesn't necessarily understand the abstract concept of x in $2x + 3 = 9$, whereas by the time most people reach Year 9 maths they understand the idea of algebra.

Changes in social interactions also occur across our lives. Specifically, changes in an individual's relationships with other people and their skills in interacting with others. Examples include learning how to cooperate with others, form close and meaningful relationships and understanding how to function effectively and collaboratively within groups and society. Small children don't understand that effective functioning in groups requires give and take, whereas by the time a person reaches their teenage years they begin to understand the requirements of effective group involvement.

Changes don't always lead to building new skills. Natural aging leads to changes that can result in a deterioration of people's physical, cognitive, social and emotional skills and abilities. For example, as people move into the later stages of adulthood, many lose the capacity to move freely and easily, often requiring mobility aids like a walking stick or a wheeled walker. Other people can begin to struggle with the speed of mental processing or their memory.

INDIVIDUAL DIFFERENCES

It is important to note that no two people will age and develop the same way. Some may maintain their skills and abilities well into older adulthood, whereas others may begin to decline quite early. There is no way to predict in what areas an individual may decline, although examining family histories can give clues to possible areas of difficulties. However, there are many things that doctors, and other specialists recommend to support and promote healthy aging, including maintaining consistent physical and mental activity levels throughout adult life.

Unfortunately, there are also conditions which can increase the speed of this decline in strength and skill; some of these are well known, for example **Alzheimer's Disease** and **Dementia**. Physical injuries, whether to a particular part of the body or brain, can also cause changes in a person's skills and abilities. **Traumatic brain injuries (TBI)** including concussion can cause significant changes in many areas of a person's cognitive capacities, depending on where the damage has occurred to the brain.

STAGES OF DEVELOPMENT

There is no doubt that humans go through changes during their lifespan. One of the areas that has created debate however is the process by which these changes occur. Some theorists believe that the changes humans experience are continuous and involve gradual and ongoing development throughout the lifespan, for example, height. This is known as continuous development. While other theorists believe that the changes involve distinct and separate stages. For these theorists, each stage has particular changes that must occur before the person can be viewed as having moved to the next stage. This is known as discontinuous development.

Examples of some of the theories of development will be examined more closely in the next section. For now, it is important that you understand that there is an overarching structure that human development generally follows, and that our understanding of this structure continues to evolve the more psychologists study human development.

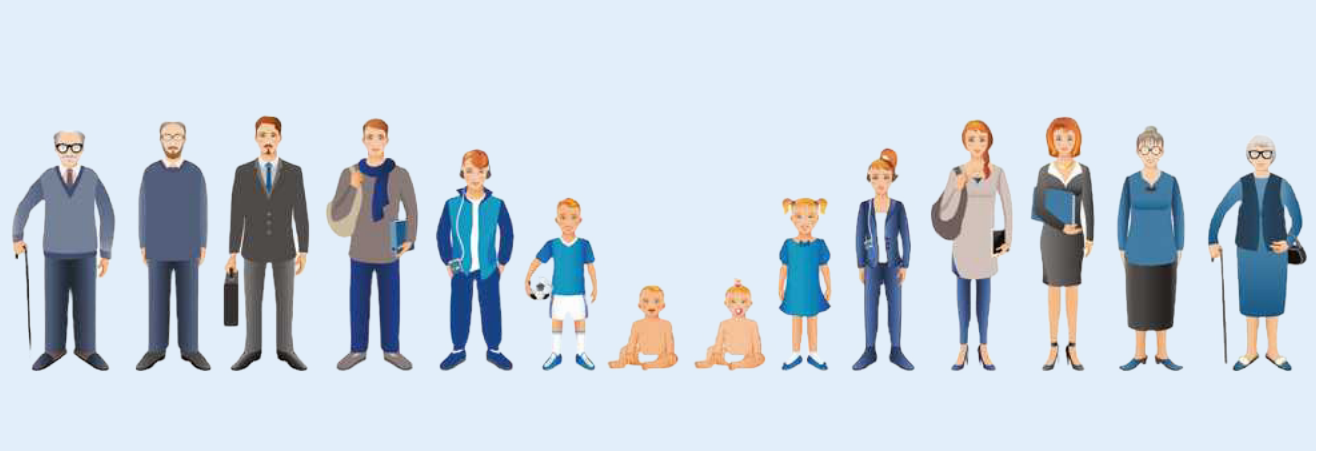


Figure 3.1.2: The various stages of human development.

AREAS OF CHANGE

There are four main areas of human development that undergo changes across our lifespans. These are: Biological, Cognitive, Social and Emotional. Let's examine each of these areas in more detail.

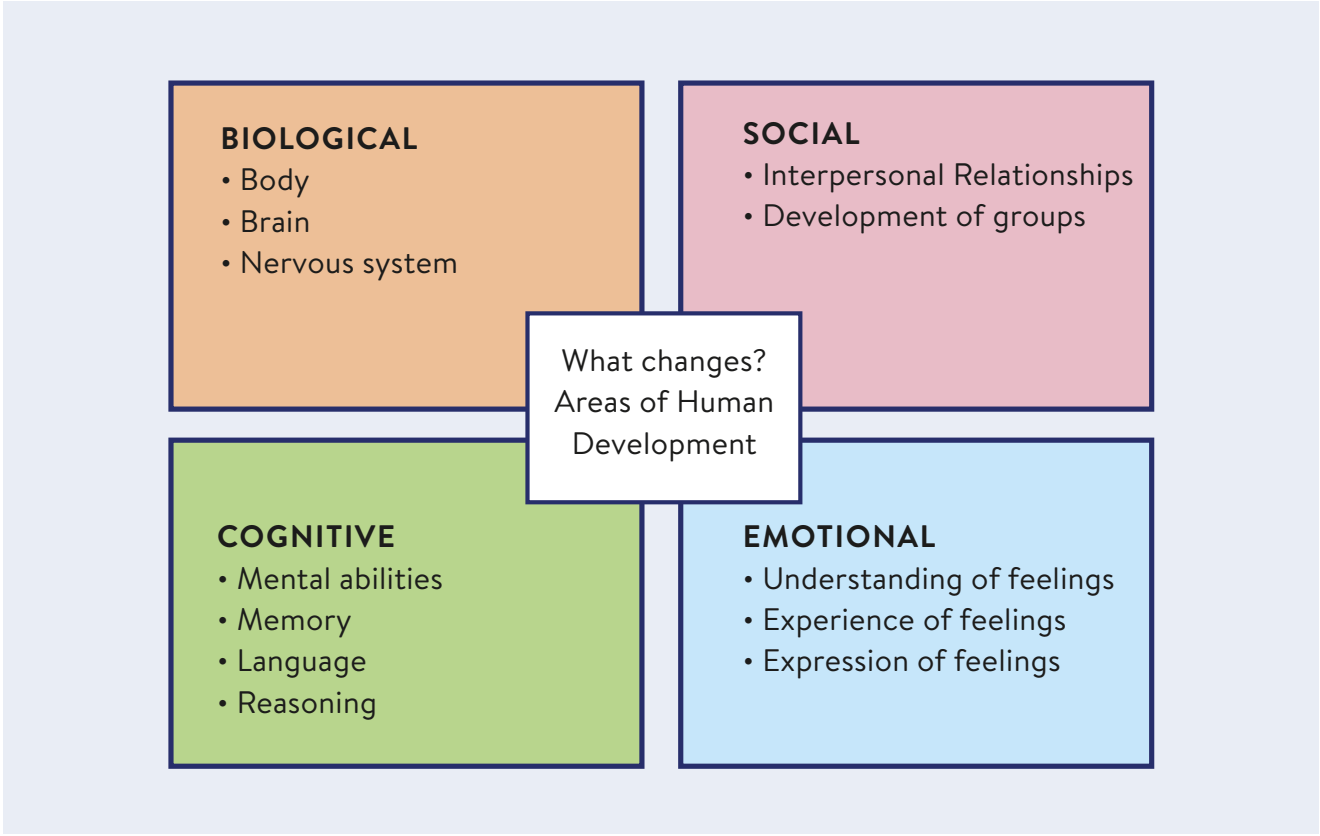


Figure 3.1.3: Areas of change across the lifespan.

BIOLOGICAL CHANGES

The biological changes that people go through include the development of the body, how it grows from a newborn who is unable to hold its head up, see clearly, speak or move and who reacts only reflexively, to the fully-grown able-bodied adult, able to walk, sit and stand independently. This **physical development** is linked to aging and the development of the brain and the nervous system, all of which are interlinked in complex ways to allow the full range of human movement, thought, action and reaction.

It should be noted that these biological changes not only occur as infants grow, as people get older they undergo other biological changes that lead to deterioration of skills and abilities. Some may develop specific conditions, like Alzheimer's or Dementia mentioned previously, however even those who do not develop these conditions still experience biological deterioration as they age.

SOCIAL CHANGES

As humans grow, we move from being very **egocentric** (self-involved, "it's all about me") as young children to adults who are able to understand others and interact with them effectively.

Have you ever watched young children playing? Particularly toddlers who are still trying to figure things out? They can struggle to interact with others at times, particularly if they each have different ideas about how a game should be played, or if everyone wants the same toy. Each child wants to have things their own way, and they struggle to do things like share and take turns. These are skills that develop slowly and require practice.

By the time humans reach young adulthood, they are generally able to understand the ideas of sharing and compromise and can make choices about how they want to interact with others. The development of this social understanding and ability to interact effectively with others is how they come to form close relationships as adults. Difficulties in this area, or gaps in the development of these skills can lead to significant difficulties navigating the adult world and in forming positive relationships.

COGNITIVE CHANGES

Cognitive changes refer to the development of a person's mental abilities, including, learning, memory, **perception**, language, **moral reasoning**, problems solving and decision making.

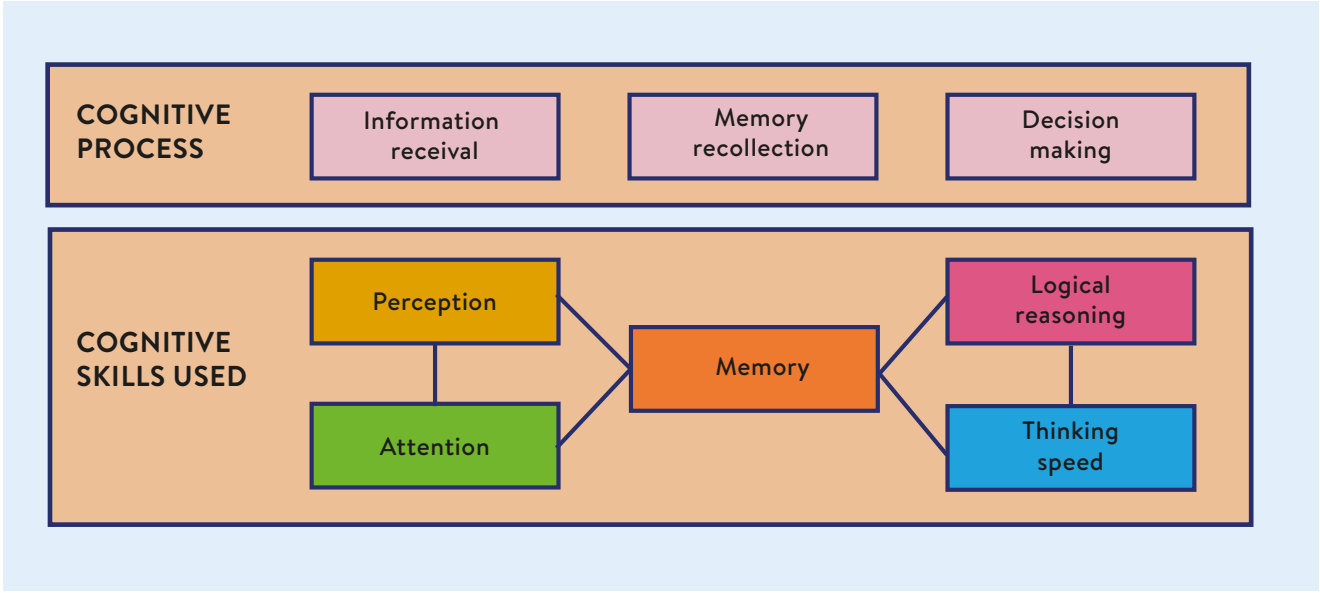


Figure 3.1.4: Cognitive processes and skills.

One clear example of cognitive changes that occur in humans is the development of language. We begin life crying to alert others (usually our family) to express that we need something, food, nappy change, another blanket etc. Typically developing children will begin to make babble noises, which are considered the precursor to speech sounds, as young as four months old.

By the time children reach pre-school, most are little chatterboxes when they feel safe, and they can articulate their needs clearly to those around them.

Language skills continue to develop and become more refined across the lifespan. For example, in young adulthood the ability to select and appropriately use different types of language and modify responses to different people or events is developed and refined. What does that mean? You wouldn't use the same words and tone to the school principal or your boss at work as you would to your best friend, would you?

CHECKING FOR UNDERSTANDING

What changes? From what you have read above, and from what you already know and understand, brainstorm changes for each of the headings below.

BIOLOGICAL	COGNTIVE/ PSYCHOLOGICAL	SOCIAL

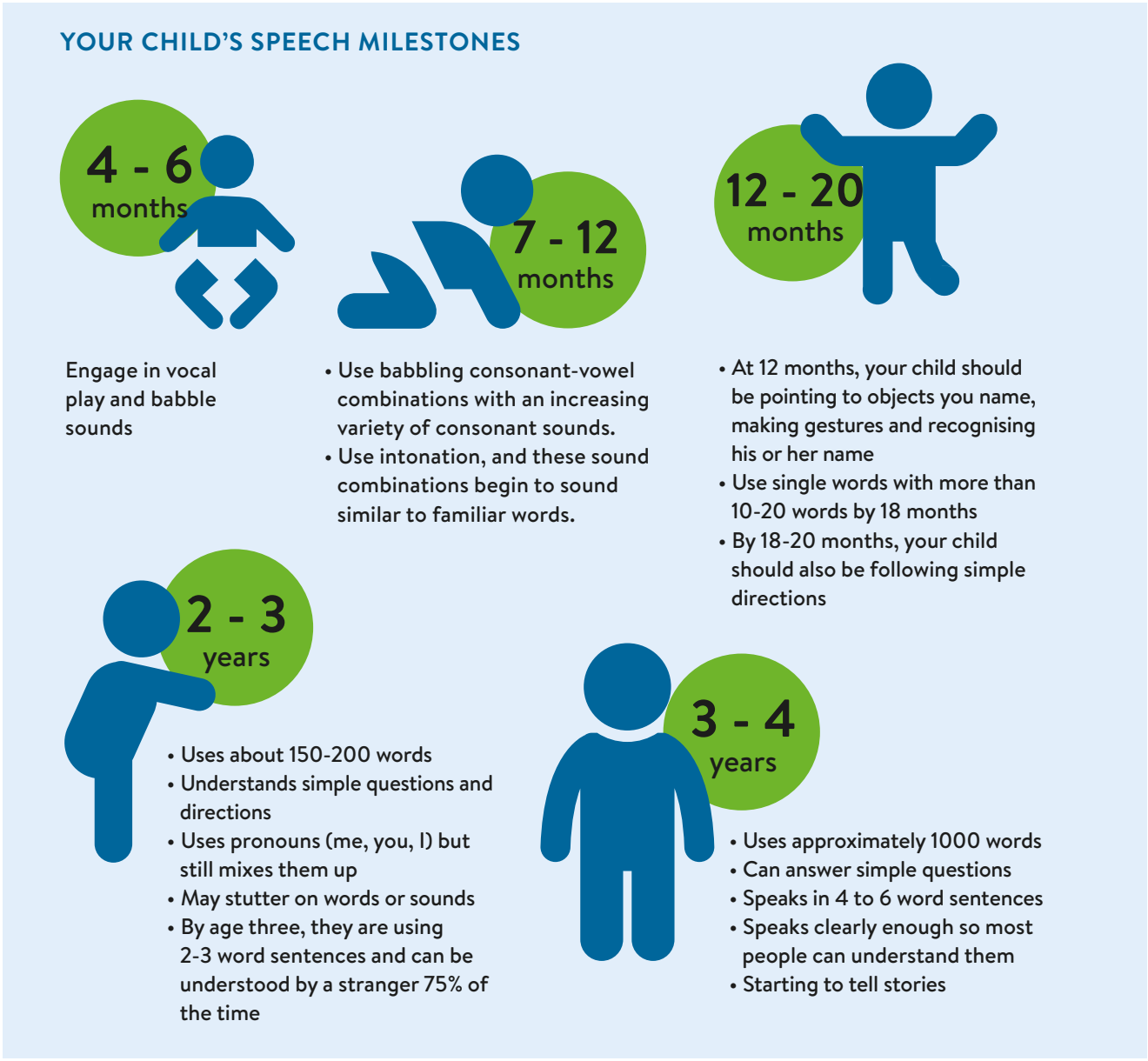


Figure 3.1.5: Speech milestones in the first four years of life.

EMOTIONAL CHANGES

Emotions will be discussed in greater detail later in this book, however for the purpose of this chapter, it is important that you understand that the emotional range of humans is vast; however, this range takes time to develop, and to be understood. Babies have a limited range and tend to express all emotions through loud vocalisations, for example, crying and body movements. As we grow and experience more of life, so too do the nuances of our emotional range and (hopefully) the ways we are able to express these emotions become more varied and effective.

WHY DO THINGS CHANGE?

Changes can occur in humans as a result of the natural development that occurs through ageing. However, they can also occur as a result of injuries, or disorders or diseases. Much of what is discussed in this chapter refers to 'normal development'. However, individual differences occur, and for some development can occur at different rates for a variety of reasons and still be 'normal'.

NATURE VERSUS NURTURE

Much of our physical development occurs as a direct result of biological changes. That is, our body and brain grow, and this growth results in changes to not only our body and brain, but the way we use them to move, interact and learn. However, how does this lead to who we become as people? What makes some of us quiet and shy? And others loud and gregarious? How do we actually learn how to speak or read? Why are people in some families incredibly similar, and in other families there is one person who is different? Why are there differences in speech and language development within families? Psychologists and society have spent considerable time across human history trying to work out how much of who we are as

humans is influenced by our biology (genetics) and how much by the environment we live in. Known as the **Nature versus Nurture debate**, it has raged for a long time, pretty much as long as humans have existed, and in short, the conclusion at this point seems to be that both of these factors interact in complex ways to shape us.

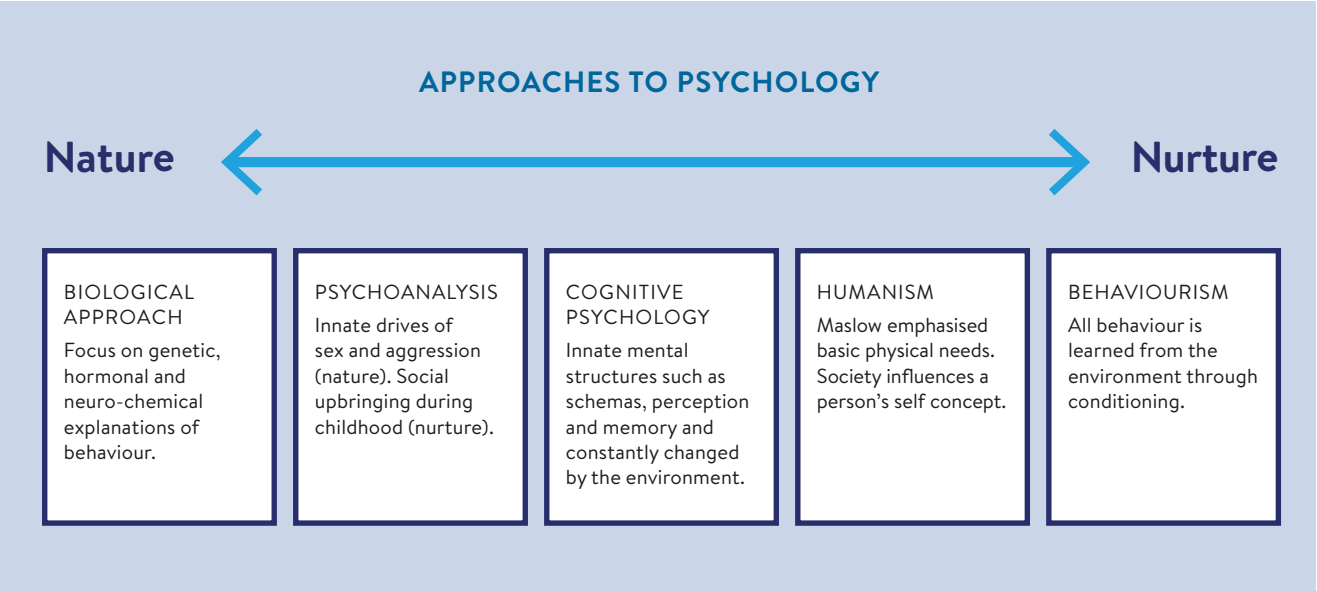


Figure 3.1.6: Theoretical approaches to Psychology and their links to the Nature versus Nurture debate.

CLASSROOM ACTIVITY - RESEARCH

Read the following research article: Perceptions of nature, nurture and behaviour
https://tinyurl.com/3ae2dkyb

Based on this information, find some other sources of information about the Nature versus Nurture debate and use what you discover to answer one of the following questions:

Choose a side and argue your point of view – is it Nature or Nurture?

Possible questions (feel free to come up with your own):
- 'Criminals just have a more aggressive nature'
- 'You're either born smart or you're not
- 'Good people are born, not made'
- 'Anyone can be an Olympian'.

3.2 THEORIES OF DEVELOPMENT IN LIFESPAN PSYCHOLOGY

There are different theories of lifespan development in psychology, often including components of the biopsychosocial model.

The different theories of development can be applied to different individuals at different times.

The development of social behaviour is influenced by different family structures, whether they involve:

- individual attachments
- extended family structures multiple attachments, such as in Aboriginal or other cultural groups.

2023 Subject Outline | Stage 1

Theories of development

THEORISTS AND THEORIES

Over the years there have been a number of theories developed about how and why humans grow and develop. Arguably three of the most influential theorists in our understanding of human lifespan development will be discussed here. These theorists: Jean Piaget, Len Vygotsky, and Erik Erikson each examined human development and have helped to shape our understanding from their unique perspectives. The biopsychosocial model is a more wholistic approach that incorporates many elements from these theorists and suggests that it is interactions between the biological, psychological and social that all work together to influence human development.

JEAN PIAGET – COGNITIVE DEVELOPMENT

Jean Piaget (1896-1980) was a Swiss Psychologist who is credited with being the first person to undertake targeted research into the development of children (Encyclopedia Britannica). He proposed that the development of mental abilities occurs as we adapt to the changing world around us.

Piaget proposed the idea that humans have what he called **schemas** which help us to understand the world. He described schemas as basic units of knowledge that relate to all parts of the world. Essentially, he figured out that our brains try to help us manage all the information we are bombarded with each day by developing groups of objects that are easily identifiable and are based on common features, that is, schemas. We then use these schemas to help us more quickly and easily understand the world around us. For example, we might see a magpie and know it's a bird due to its similarities to crows or kookaburras. Here you are using your bird schema. Schema's can relate to not only objects, but also to different roles, events, or even to ourselves.

HELPFUL ONLINE RESOURCES

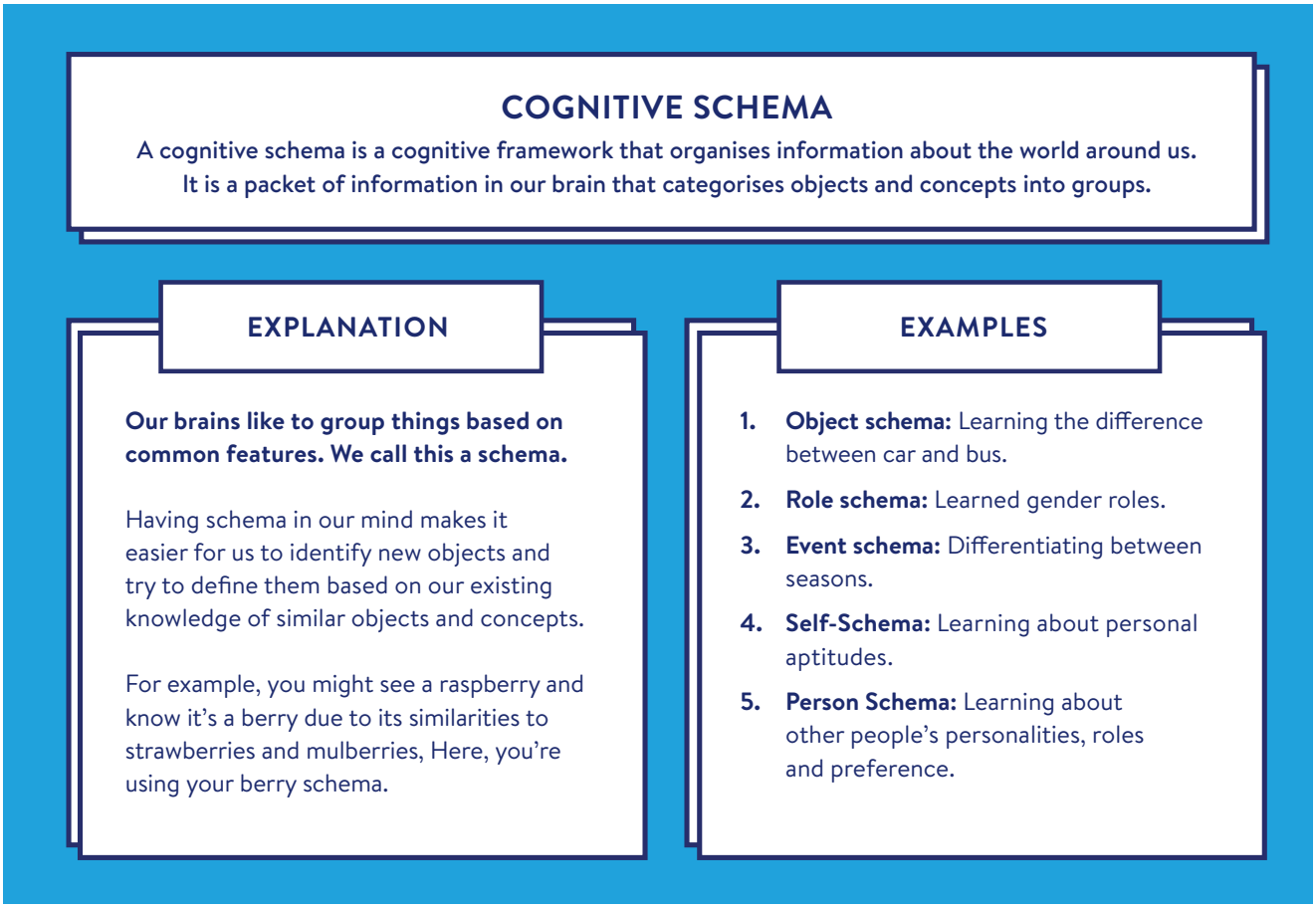
Schema, YouTube
https://tinyurl.com/ya9fa484

What is a schema? YouTube
https://tinyurl.com/wujjrtah

Piaget theorised that as we grow and develop, our ability to understand the world changes, and schemas help us to do this. He called this process of change **Adaptation** and suggested that there were two processes involved in adaptation: assimilation and accommodation.

Assimilation is the process of taking in new information and making it part of an existing schema about objects or the world. Piaget believed that we do this to make sense of or to explain the new parts of the world around us by fitting it in with the old parts we know. For example, a child may see a truck for the first time and call it 'car' because he is fitting the new information in with the old, known information, that is, it has four wheels, so it is a car. In this way assimilation involves slotting new information into an existing schema.

Accommodation is a more complex process than assimilation and occurs when we are not able to assimilate new information. Unlike the child assimilating the truck to be included in their understanding of 'car', accommodation forces us to change our existing schema to include the new object, experience or information. An example here might be the child creating a new category for understanding different four wheeled machines that are bigger and pull a trailer is called a 'truck'. If there is no schema that is similar to the newly experienced item, we are able to create totally new schemas if they are required. Piaget believed these



3.2.1: Schema explanation.

changes in understanding occur as children move through each stage of development.

PIAGET'S FOUR STAGES OF COGNITIVE DEVELOPMENT

Piaget developed a theory to understand how child cognitive development proceeds (Piaget, 1976). His theory states that children move through four distinct stages of development. Each stage is linked to an age range; however, he acknowledged that individuals may move through the stages at different rates. Piaget believed that individuals could not acquire later stage skills without first mastering the earlier skills. He also suggested that each stage included a particular **cognitive accomplishment** that needed to be achieved prior to being able to move to the next stage of development.

Stage 1: Sensorimotor stage, birth – 2 years old

The **sensorimotor** stage is characterised by the infants developing their understanding of the world by coordinating sensory experiences (e.g. touch, vision) with motor abilities (movement). Babies use only reflexive movements, because they do not yet have the ability to coordinate information from their senses. For example, a baby may accidentally touch a toy when its arms are moving, however at this point they don't yet understand they can touch the toy on purpose.

After about three months most infants develop the ability to integrate sensory and motor information and begin to coordinate movement, that is, the baby realises it can reach for a toy it can see and pick it up.

Children in the sensorimotor stage develop the ability to carry out **'goal directed behaviour',** that is, the infant sees a favoured toy, and then purposefully moves to it, picks it up and hugs the toy (goal is to hug the toy).

At the beginning of this stage, babies are unaware that things that move outside of their field of vision continue to exist. Babies find peek-a-boo so much fun as they are truly surprised when the person playing moves their hands and they can see them again. This idea of continuing existence when something is out of view is the cognitive accomplishment linked to this stage. It is called **object permanence**, that is, that even though something is no longer in sight it still exists and is an important step in a baby's cognitive development.

HELPFUL ONLINE RESOURCES

Sensorimotor, YouTube:
https://tinyurl.com/5n7znbs7

Birth to 2 years of age	2 to 7 years of age	7 to 11 years of age	12 years of age through to Adulthood
SENSORIMOTOR STAGE	**PRE-OPERATIONAL STAGE**	**CONCRETE-OPERATIONAL STAGE**	**FORMAL-OPERATIONAL STAGE**
First stage of child's mental development which mainly involves sensation and motor skills such as hear, sight, feel, taste, move, manipulate, bite, chew etc.	In this stage, children use their mental ability to represent events and objects in various ways such as using symbols, gestures and even communication, thus their logical reasoning is not yet organised or developed.	At this stage the child becomes more stable, thinks operationally and uses logical reasoning rather than intuitive thought.	When children become more systematic and reasonable and they cannot only reason with tangible objects and events but they also possess capability of reasoning and thinking in more abstract, hypothetical and idealistic ways.

Figure 3.2.2: Piaget's Stages of Cognitive Development.

Stage 2: Pre-operational stage, 2 years – 7 years
As children get older and move into the **preoperational stage** they begin to think in more sophisticated terms. They become increasingly able to internally represent events, which means that they are able to picture things in their minds and use symbols. This is where the ideas of assimilation and accommodation mentioned previously begin to occur.

This development of **symbolic thinking** is important as it is not only the basis of children coming to understand letters, words, and numbers, but also allows them to engage in pretend play through imagining places, people, and scenarios in their mind.

Children in this stage are described as **ego-centric**, which means that they have difficulty seeing things from another person's perspective. They may struggle to understand why another child is sad when they took a toy from that child. It is important to understand that this is not the same as the child being selfish. They simply do not understand that the other child would not see things the same way they see them.

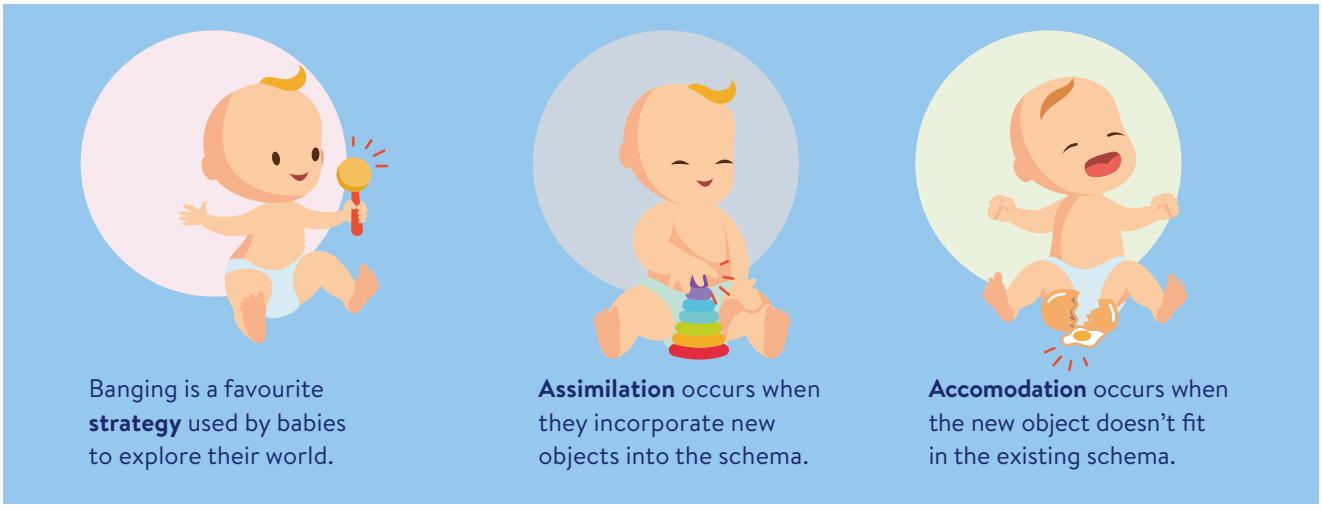


Figure 3.2.3: The use of schema, assimilation and accommodation begins.

The cognitive accomplishment of the preoperational stage is the understanding of sharing, and the ability to see things from the other child's point of view is developed. When the child can see from another's perspective, their thinking shifts to **decentred thought**, and is the cognitive accomplishment of the pre-operational stage.

During this stage children will think using the idea of **animism**. This is the thought process where children believe everything is like them and has a consciousness. For example, they may refer to the rusty bike as being 'sick' or if they accidentally hurt themselves bumping into a door, they may call the door 'naughty' and blame it for hurting them.

Another cognitive process that becomes evident in this stage is that of the idea of **transformation**. This occurs in the latter part of this stage and is when the child becomes able to identify the beginning and end point of a transformation, for example that the puddle of red goo on the concrete is actually the remains of their raspberry ice block.

Stage 3: Concrete operational stage, 7 years – 12 years
In this stage the child's thinking revolves around what they know and what they can experience through their senses, that is, what is concrete. They are able to understand that there are four apples in a bag, that there are objects in space and that a week is longer than a day, as each of those are concrete things they can see or experience.

In this stage the cognitive accomplishment is conservation. **Conservation** is the idea that an object doesn't change weight, mass, volume, or area when it changes shape or appearance. That is, children come to understand for example that 250mls of water can look different in different containers, but that it remains 250mls of water, regardless of the container.

HELPFUL ONLINE RESOURCES

Piaget's Preoperational Stage:
https://tinyurl.com/ppby5b5h

Piaget – Egocentrism and Perspective Taking (Preoperational and Concrete Operational Stages):
https://tinyurl.com/5hate6z3

PIAGET'S CONSERVATION TASK

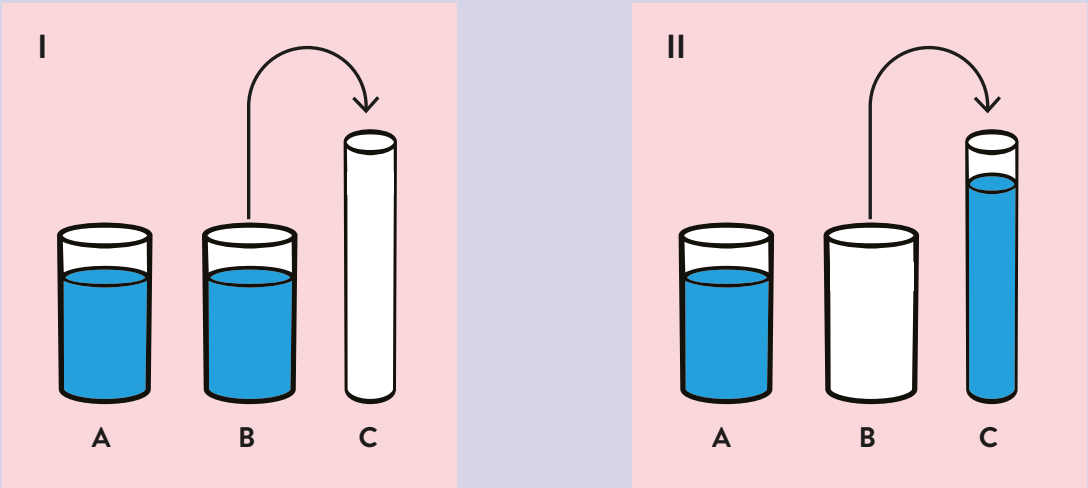


Figure 3.2.4: Children are able to understand that the liquid in A and B is the same as in C.

Another cognitive process that develops in the concrete operational stage is **classification**, that is, the ability to organise information into categories based on common features. For example, a child may be able to look at a number of images and group them based on their colour, shape or size.

TESTS OF VARIOUS TYPES OF CONSERVATION

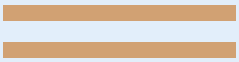
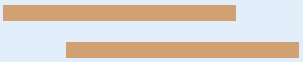
Type of conservation	Initial presentation	Transformation
Volume	Two equal glasses of liquid	Pour one into a taller, narrower glass
Number	Two equal lines of apples	Increase spacing of apples in one line
Matter	Two equal balls of clay	Squeeze one ball into a long, thin shape
Length	Two sticks of equal length 	Move one stick 

Figure 3.2.5: Examples of other types of transformation.

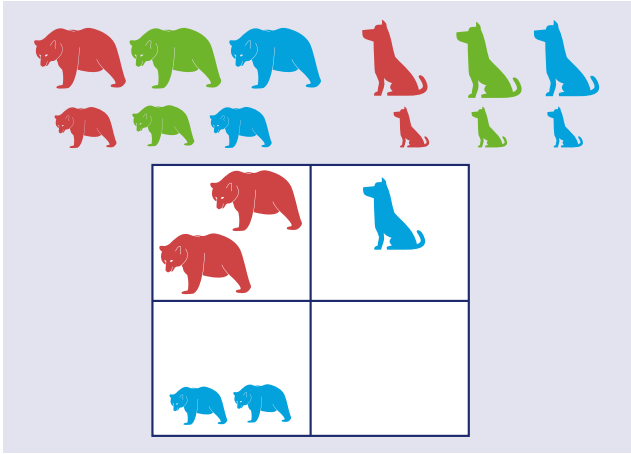


Figure 3.2.6: Classification example.

Essentially, these changes to their cognitive processes and abilities means that children begin to see and experience the world more accurately. They develop the ability to think logically about concrete objects and understand simple changes to them. By the end of this stage, a child will have developed the ability to create mental pictures of objects and processes, and they begin the move towards abstract thinking, that is, understanding the idea that not everything is concrete.

Stage 4: Formal operational stage, 12 years to adulthood

The formal operational stage is the last stage in Piaget's theory of cognitive development. When the cognitive accomplishments of this stage are met, Piaget considered that a person's cognitive capacity was fully developed. Piaget and subsequent researchers have acknowledged that not everyone reaches Stage Four. People who have a severe intellectual disability may not progress past the first or second stage.

HELPFUL ONLINE RESOURCES

Piaget's concrete operational stage:
https://tinyurl.com/2p95cvjf

It is in this stage that Piaget believed humans develop the ability to understand, consider and manipulate abstract concepts. There are two cognitive accomplishments associated with this stage, **abstract thinking** and **logical thinking**. Abstract thinking refers to a way of thinking that does not rely on being able to see or visualise things in order to understand concepts. It includes the ability to understand concepts like ethics and morality and ideas like honesty, or the difference between the mind and the brain.

Other examples of abstract thought that develop in this stage include:

- the ability to think in hypothetical terms
- the capacity to engage in deductive reasoning and form hypotheses.
- the ability to solve logical puzzles or clues.

It is during this time that the ability to engage in **idealistic thoughts** also emerges. For example, teenagers develop the ability to compare themselves to a role model, consider their future and make plans and decisions about how to make their life resemble their role models.

Figure 3.2.7: Renowned fictional detectives and logical thinkers: Hercule Poirot (David Suchet), Sherlock Holmes (Benedict Cumberbatch), Dana Scully (Gillian Anderson), Nancy Drew (Kennedy McMann) and Miss Marple (Julia McKenzie).

LOGIC PUZZLE:

https://tinyurl.com/42scathh

Abigail, Oliver, Rosa, and Blake all attend the same summer camp, where they can cook, kayak, rock climb, and zip-line. Each child has a different favourite activity.

- Abigail's favourite activity isn't rock climbing.
- Oliver is afraid of heights.
- Rosa can't do her favourite activity without a harness.
- Blake likes to keep his feet on the ground at all times.

Can you figure out who likes what?

Answer: Abigail likes to zip-line, Oliver likes to kayak, Rosa likes to rock climb, and Blake likes to cook.

CHECKING FOR UNDERSTANDING: Summarise your learning below

PIAGET: THEORY OF DEVELOPMENT

SENSORIMOTOR STAGE	PRE-OPERATIONAL STAGE	CONCRETE OPERATIONAL STAGE	FORMAL OPERATIONAL STAGE

ADAPTATION

SCHEMA	ASSIMILATION	ACCOMODATION

ERIK ERIKSON – PSYCHOSOCIAL DEVELOPMENT

Erik Erikson (1902-1994) was a psychoanalyst who developed a unique theory of **psychosocial development**. It was unique because it not only described the impact of developmental changes, but also acknowledged the impact of wider social influences (Dunkel & Harbke, 2017).

Erikson believed that social development occurs through a combination of the effects of psychological processes and the experiences of the individual in their lifetime. His theory is made up of eight stages. Each stage includes a **psychosocial crisis** that the individual must navigate successfully to move to the next stage. They are called psychosocial crises because in each crisis the needs of the individual do not align with the needs of society. That is, the person finds themselves in a social dilemma that they must solve.

According to Erikson, when each stage is navigated successfully, it allows the person to progress to the next stage and forms the basis for the development of a healthy personality and positive social skills to navigate future social interactions successfully. The interactions within each stage can be positive or negative, however for healthy development to occur, the positive interactions need to outweigh the negative ones. Erikson believed that this positive skew is what allowed the development of a healthy personality and that if a person experienced more negative interactions, it is what led to poor social development and impacted all future interactions.

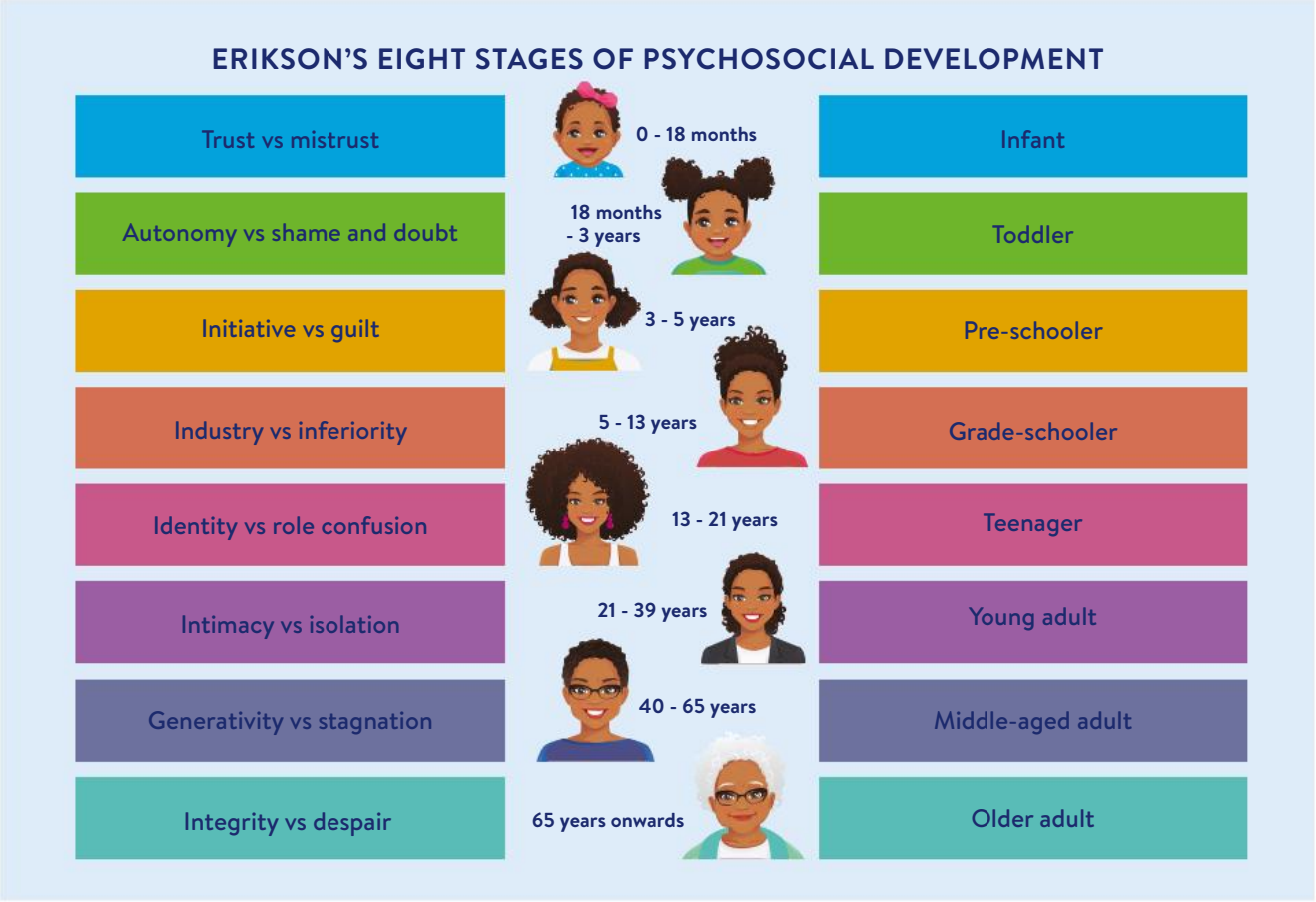


Figure 3.2.8: Erikson's stages of psychosocial development.

Stage 1: Trust versus Mistrust, birth – 18months

The aim of this stage is to develop a healthy sense of **trust**. This occurs initially by parents and caregivers responding to their infant. If, every time the infant expresses a need, their caregiver always responds to that need, they develop the understanding that the world is predictable, safe, caring, and happy. That is, they develop trust that their needs will be met.

If these needs aren't met, Erikson believed that the infant would develop a sense of **mistrust** and would grow to be anxious, insecure, and suspicious of others.

Stage 2: Autonomy versus Shame and Doubt, 18 months – 3 years

Erikson believed that if toddlers are supported during this time in their attempts to establish their independence it contributes to a sense of **autonomy**, or the understanding that they are able to do things for themselves. For example, toddlers feeding themselves can be incredibly messy, however encouraging and supporting them to try to do it independently develops this sense of autonomy. This leads to them thinking things like "I can do things myself" which helps to develop feelings of self-control, self-confidence, self-reliance, and competence. A child

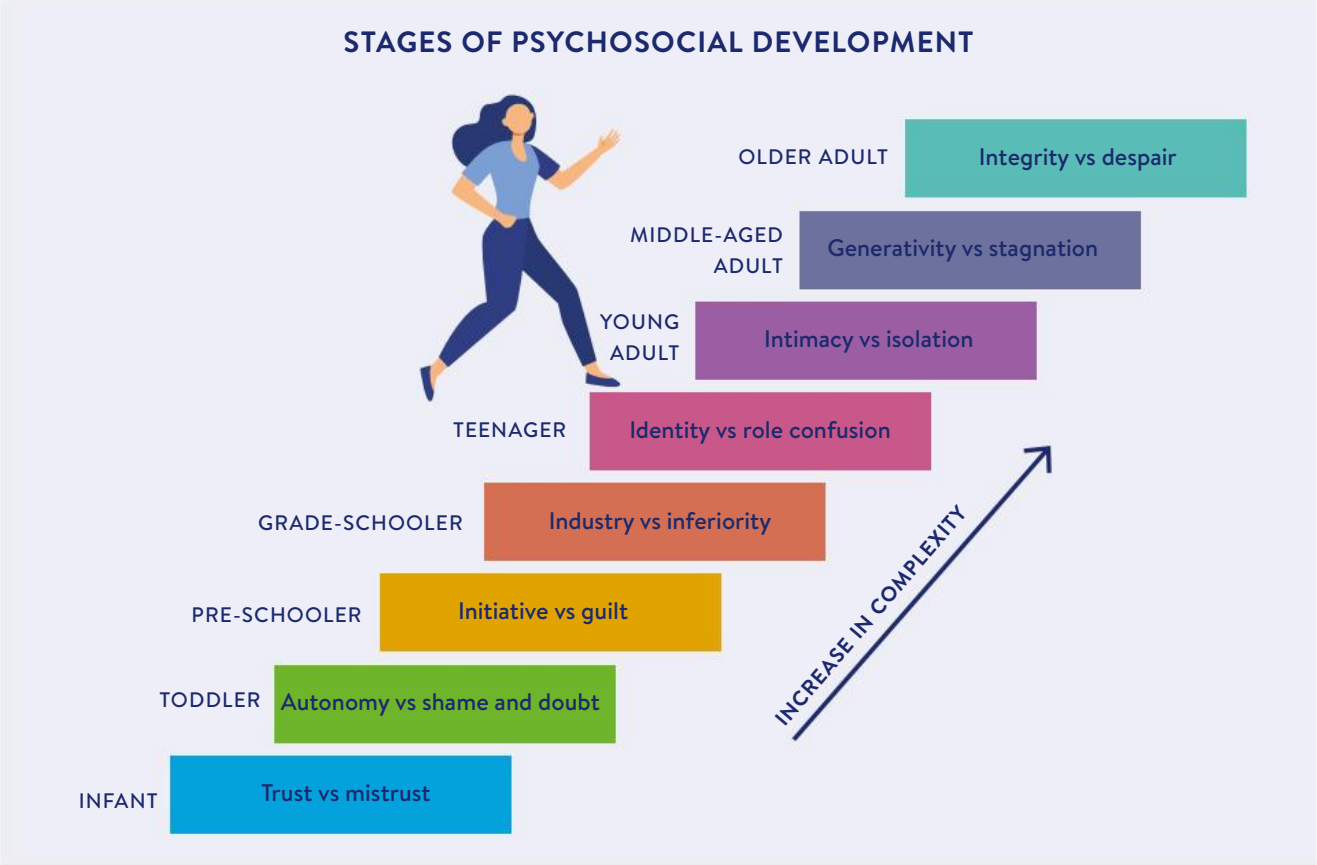


Figure 3.2.9: Erikson's Stages of psychosocial development.

who has a well-developed sense of trust is more likely to be prepared to try things and thus develop further their sense of autonomy.

Alternatively, if children are not encouraged to try things, or have things done for them all the time, they become too dependent on others which can lead to a lack of self-confidence, self-consciousness, shame and doubt.

The psychological crisis in this stage comes in the form of too little or too much control from carers or adults. Too much control and help will result in children who are unable to develop their sense of autonomy, too little control and the child will become demanding, controlling, and dependent.

Stage 3: Initiative versus Guilt, 3 years – 5 years
Having developed a sense of trust and autonomy, the child is beginning to understand their own abilities and wants to explore. They begin to show **initiative**; being able to plan, think for themselves and carry out various kinds of activities with purpose. Most often, this comes in the form of play with other children.

They also begin to learn the limitations of using their **initiative** that is, rules and how to follow them. It is this conflict between being independent and possibly developing feelings of guilt if they break the rules that is the crisis of this stage.

Erikson says that whether a child leaves this stage with a stronger sense of initiative than **guilt** depends largely on the responses of the parents, caregivers, and other supportive adults around the child. For example, if children attempt something and get it wrong or break something, it is important that the adults around them avoid excessive criticism or ridicule and instead encourage the child to try other or different ways to achieve their goal.

Stage 4: Industry versus Inferiority, 5 years to 12 years
Children have a desire to learn how things are made, how they work and what they do. They begin to develop the ability to do more things on their own, like read and write for example, and they also develop an understanding of any skills or talents they have. In this stage, if children are given encouragement, time and praise, they will develop a strong sense of **industry**, or a sense of their ability to successfully do things. If they are punished or shamed, and discouraged instead, they develop a sense of **inferiority**. That is, they feel like whatever they try they aren't good enough and eventually they may stop trying all together.

During this stage, the psychosocial crisis comes in the form of the child's social interaction skills. If they are able to successfully have positive social interactions they will feel a sense of industry, however if they have difficulty in these interactions it can lead to a sense of failure.

Stage 5: Identity versus Identity Confusion, 12 years to 18 years
Erikson believed that the achievement of the child in this stage is to use their cognitive abilities to bring together everything they know and have learned about themselves to create an **identity**, that is, an idea of who they are. He believed that if the child has a sense of trust, autonomy, initiative and industry, then they are more likely to create a meaningful identity. This means that everything the child has learnt about themselves, e.g., they are a boy, like pink and think skating is cool, gets added to new ideas and comes together to form their identity.

If this integration does not happen effectively, it can lead to a sense of identity confusion with the teenager being unsure of their place in society. Erikson believed this identity confusion is often seen in delinquent young people who have not yet developed a sense of themselves that fits comfortably. The psychosocial crisis of this stage is the development (or not) of a stable sense of self.

It should be noted that a certain amount of **identity confusion** is normal, and that not having a clear identity in this stage doesn't mean it won't form later. It is during this time that teenagers often experiment with a range of identities, learning from those around them, trying out new ideas, ways of being and living that they believe fit well with who they are. For example, it may be at this time that the teenager comes to understand that they don't fit into the gender binary and makes choices as to how to express their true self.

Stage 6: Intimacy versus Isolation, 18 years – 25 years
The focus of this stage is the development of intimate relationships outside of the family, without losing the newly formed sense of self. **Intimacy** does not only refer to sexual relationships, but it also refers to all meaningful relationships. Erikson suggests that true intimacy is not possible without first developing a strong sense of personal identity.

The crisis is in developing this sense of intimacy with others and avoiding a sense of loneliness and isolation, without losing the sense of self.

Stage 7: Generativity versus Stagnation, 25 years to 65 years
This stage revolves around a person wanting to leave their mark on the world in some way that will make the world a better place. This is called **generativity**. Essentially, people that achieve generativity build their lives around doing things that help others and will leave a lasting impression on future generations. Movement towards achieving this happens towards the middle of this stage.

If this is not achieved, then people develop a sense of **stagnation**. They are often self-absorbed, closed to new experiences, too concerned with personal needs and comfort, and show limited or no interest in personal growth or care for the world around them.

It is important to note that stagnation may occur for all, even those who are mostly focused on a sense of generativity. It is these times of stagnation that allow for rest and relaxation.

The psychosocial crisis here comes in the battle between individuals feeling able to positively contribute to the world around them versus feeling insignificant and that any actions are trivial and unhelpful.

Stage 8: Integrity versus Despair, 65 years onwards
In this stage Erikson believes that individuals look back on their life and take stock of how they have lived. He believed that the psychosocial crisis of this stage was whether or not the person felt they had lived a life of **integrity** and are mostly satisfied with the choices they have made, that they have lived a meaningful life. Or if the opposite of this is true, they will look back with a sense of **despair** and regret.

CHECKING FOR UNDERSTANDING - POSSIBLE SCIENCE AS A HUMAN ENDEAVOUR (SHE) TASK - DEVELOPMENTAL THEORY AND EDUCATION

Schools and teachers use their understanding of human cognitive development to inform their education activity and assessment planning. Montessori and Steiner/Waldorf schools in particular use their knowledge to inform how they approach teaching and learning.

Undertake some research into these educational theories and present your understanding of how this theoretical understanding impacted their curriculum development.

CHECKING FOR UNDERSTANDING

Using the table below, record, in your own words, what you understand about each stage of Erikson's theory

STAGE	YOUR UNDERSTANDING OF THE STAGE	OUTCOME OF THE STAGE

VYGOTSKY – SOCIOCULTURAL DEVELOPMENT

Lev Vygotsky (1896-1934) was a Russian psychologist who studied the role that social interactions play in human development. Specifically, he believed that children develop their cognitive and social skills through their interactions with the other people around them. Called the sociocultural theory of cognitive development, he believed that in collaborating with other children, and interacting with and imitating more able significant people like parents, carers, older siblings, other relatives and teachers, children slowly develop their understanding, skills, and abilities.

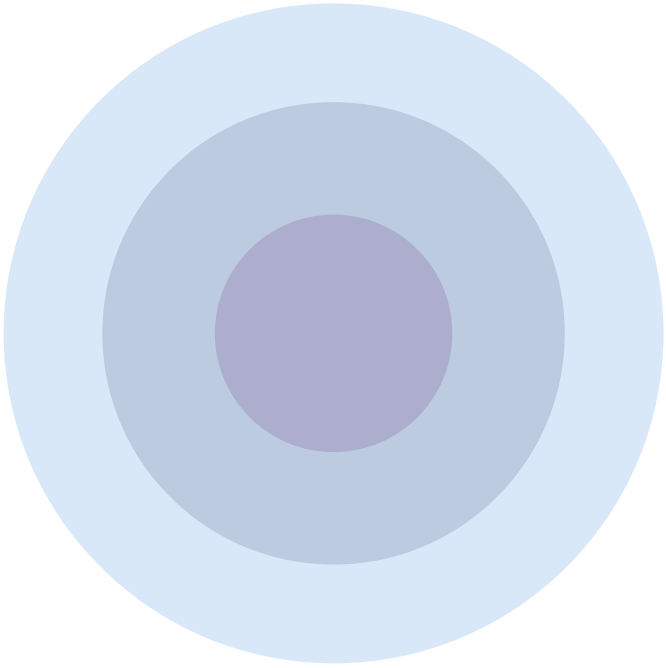
He also developed **the Zone of Proximal Development** (ZPD) which he defined as "the distance between the actual development level as determined by independent problem solving and the level of potential development as determined through problem solving under guidance or in collaboration with more capable peers." (Vygotsky, 1978, cited in Eun, B. 2019). What does that mean? It is the idea that cognitive development proceeds along a continuum. That is, that there are some tasks that children are able to use their own problem-solving skills to complete, while others require interaction and collaboration with others who are more able in order to solve them. The idea is that the best learning occurs when children spend their time working at the level that is close to the "too hard" end of the continuum, but not too far along. It's a bit like the Goldilocks principle; if things are too easy, you get bored, if they are too hard, you give up, if they are just right, that is, just hard enough to keep you interested, that's where you do your best.

CHECKING FOR UNDERSTANDING

Lev Vygotsky came up with a theory of learning that involved the Zone of Proximal Development. He said that this was where the learner needed to be guided through in order to gain a new skill.
Place the following words into your own zones on the diagram below.

ZONE OF PROXIMAL DEVELOPMENT

- Tie my shoes
- Skydive
- Talk to royalty
- Invent a machine
- Solve a conflict
- Rent a house
- Brush my teeth
- Solve algebra problems
- Act on stage



Tasks that learner cannot do even with assistance

Tasks that learner can do with assistance

Tasks that learner can do without assistance

CRITICISMS OF THESE THEORIES

No theory is perfect and there have been many theorists since who have challenged his thinking around these theories. Some critics have suggested that Piaget focussed too much on scientific type thinking and did not take into account bias or the influence of emotions, and others have criticised Erikson's theory as being too monocultural, that is, based on Western ideas only.

EXTENSION ACTIVITY: CRITICISMS OF DEVELOPMENTAL THEORIES AND THEORISTS

Research by Bernstein and other theorists who criticised Piaget's work found that:

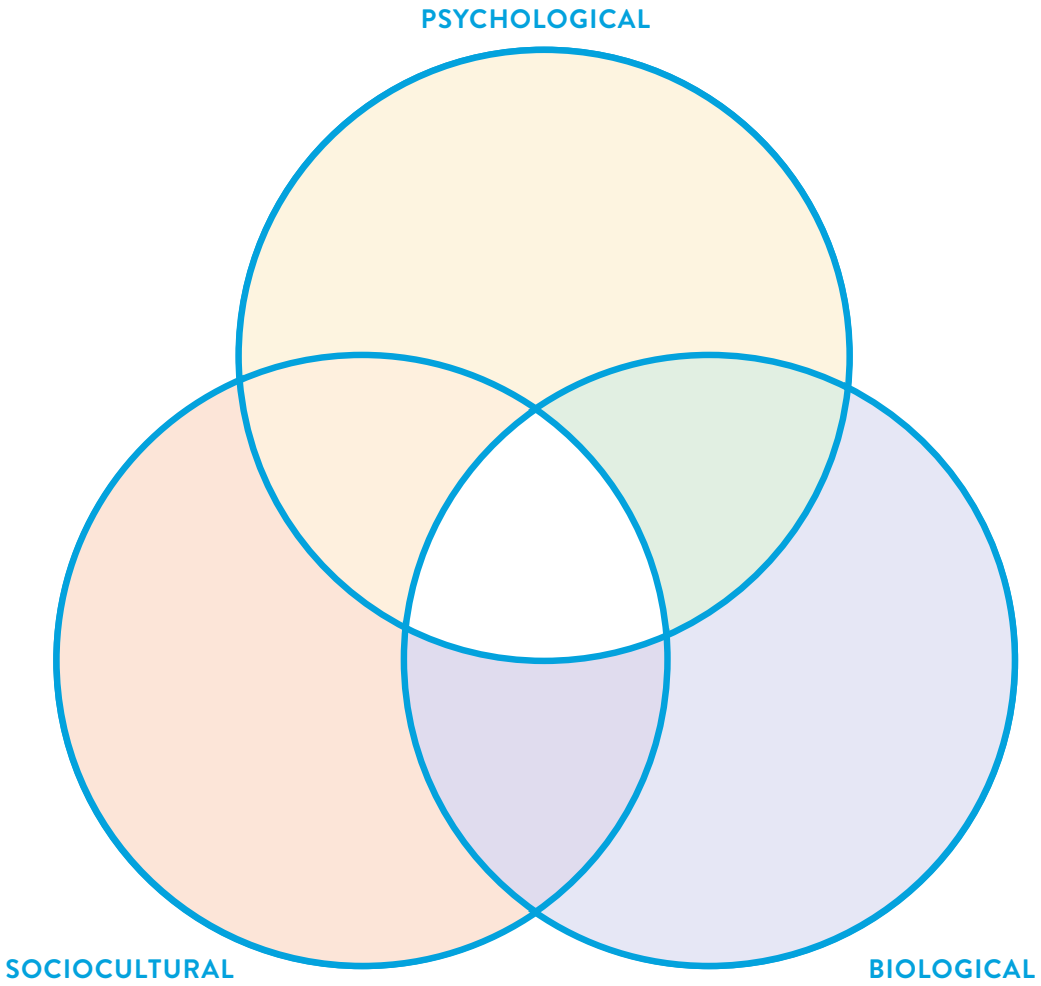
- Key cognitive accomplishments happening much earlier than his stages state
- They suggest the information processing model of cognitive development.

Your task is to undertake your own research into each of the theories presented above. Fill in the table below with your findings about the strengths and weaknesses.

THEORY	STRENGTHS	WEAKNESSES
Piaget		
Vygotsky		
Erikson		

CHECKING FOR UNDERSTANDING - THE BIOPSYCHOSOCIAL MODEL

As you will read throughout this book, the biopsychosocial model suggests that three areas of development interact with each other as humans develop to shape who we are. Based on your reading so far, can you fill in the image below to determine where elements from each of the theories discussed fits? For example, where would doing a jigsaw puzzle fit? Psychological? Because you need to understand where the puzzle piece goes? Or Biological because you need to be able to pick up and manipulate the piece with your hand? Identify 15 ways in which humans develop and place them appropriately in the image below.



UNDERSTANDING OF THE SELF

The sense of being aware of yourself as an individual person who is different from those around you with your own thoughts and feelings is an ability that develops slowly. Called our **self-concept**, this internal understanding of ourselves develops alongside our biological, cognitive, social, and emotional development and it appears that of these, our social and cognitive development seem to play a larger role.

Psychologists believe that there are two main aspects to the development of our self-concept: visual self-recognition and our self-esteem.

This idea of self-recognition is difficult to study in very young children because they have not yet learned how to speak, so researchers are not simply able to ask, "is this you?". To try to understand when self-recognition begins, observational studies with infants have been undertaken to try to determine at what age infants are generally able to recognise themselves.

Research into this area began in the late 1960's and one famous study in this area was undertaken by Lewis and Brooks-Gunn (1979) when they used dots of rouge on infants' noses to see if they could recognise something different about their own faces. Their findings suggest that prior to 1 year of age infants did not appear able to recognise themselves with consistency in a mirror. Children over one year however, seemed able to recognise their own face.

Once children develop the ability to speak and respond to questions, investigating their skills and abilities becomes much easier. When three and four-year-olds are asked about themselves and how they are different to other children, they usually distinguish themselves from others by referring to physical characteristics, possessions, or particular behaviours. For example, when asked "How are you different to Fred?" a child may respond "I have blue eyes and they have brown eyes" or "I have a blue pencil and Fred doesn't have a pencil".

As children grow, this self-understanding shifts from being based on external characteristics to internal, psychological characteristics. By the age of around 6-7 years, children are able to define themselves not only by their physical characteristics, but also in terms of their social characteristics and social comparisons. For example, "I worry a lot" or "I'm better at footy than Kylie".

By the time children reach 10-11 years, they are able to clearly distinguish between their psychological self and their physical self.

SELF ESTEEM

Self-esteem is defined as how someone thinks about themselves, their qualities, and their characteristics. It can be described as either high or low, that is, if someone has high self-esteem, they think positively about themselves, and if they have low self-esteem, they think negatively. As our understanding of ourselves develops through childhood, it helps to shape self-esteem and whether it is high or low. Significant events can have a big impact on our self-esteem development. For example, if someone whose opinion you value tells you you're stupid when you are a child, that is going to impact your self-esteem in a negative way.

Why is self-esteem important? Whether it is high or low, self-esteem can have a big impact on how we live our lives. People who have high self-esteem tend to be happier, healthier, more persistent, and optimistic, and have fewer stress related problems. The opposite is true for those with low self-esteem, they tend to be more anxious, pessimistic, and less persistent.

Does self-esteem change depending on your age? Research from 2018, which looked at 331 studies of 164,000 people has found that generally self-esteem develops between ages 4-11, and remains relatively stable between 11-15, and then builds until peaking at around 60 years. It then remains relatively stable until around 70 years, when it begins to decline. This challenges the previously held belief that self-esteem drops sharply in adolescence.

LOW SELF-ESTEEM SIGNS

- Inner voice of self-talk that is negative
- Difficulty accepting or responding to compliments
- Difficulty accepting or responding to constructive criticism or feedback
- Unhealthy methods of coping, such as overeating, drinking, or smoking
- Avoidance of social gatherings or situations
- Avoidance of challenges or difficult situations
- Focus on what is unwanted more than what is wanted
- Hesitance to try new things
- Low level of confidence
- Excessive sensitivity
- Intense focus on personal problems
- Mental health conditions such as anxiety, depression, or eating disorders

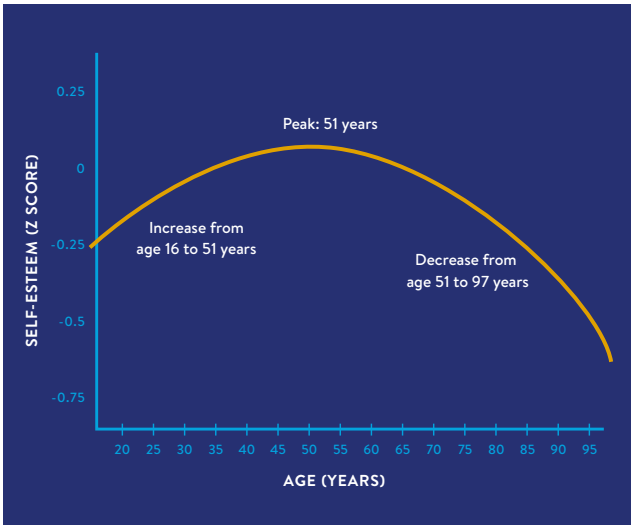


Figure 3.2.10: Self Esteem trajectory.

Other studies have found that women often tend to have lower self-esteem than men, particularly in adolescence and early adulthood, but this evens out as people age.

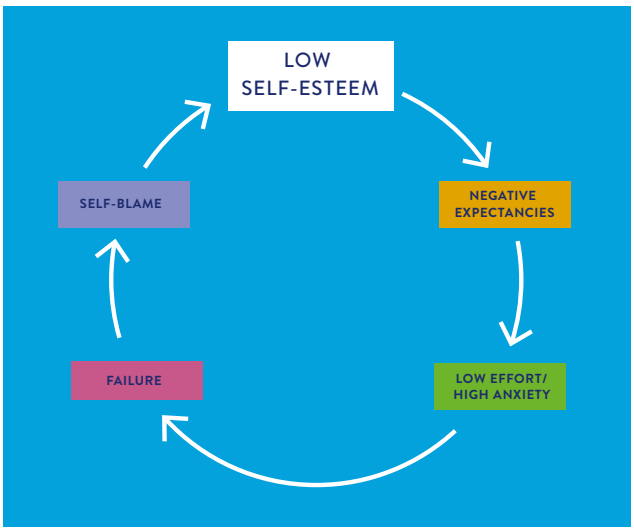


Figure 3.2.11: Low Self Esteem perpetuating cycle.

SELF ESTEEM AND GENDER – WHAT DO YOU THINK?

Are the differences between genders in relation to self esteem due to actual differences in the way the genders view the world? Or are these differences due to the way society has traditionally viewed the binary genders?

- MALES: competent, independent, assertive, confident, logical, ambitious.
- FEMALES: dependent, passive, quiet, emotional, lacking in ambition.

Remember that everyone has different experiences, and these studies describe what happens for most, not all.

BODY IMAGE AND SELF ESTEEM

Self esteem and **body image** are linked. Someone who has high self esteem is likely to have a realistic body image and be generally happy with themselves. The opposite is also true, those with low self esteem will struggle with poor body image and will often feel bad about how they look.

HELPFUL ONLINE RESOURCES

Watch the following videos to learn more about body image and self-esteem:

https://tinyurl.com/yj7azmwh

https://tinyurl.com/3ks25tph

https://tinyurl.com/bdcwtsjb

https://tinyurl.com/ynnejfxm

https://tinyurl.com/yw5brky8

https://tinyurl.com/hmmm98rj

https://tinyurl.com/5h5fxsxu

CHECKING FOR UNDERSTANDING

Based on what you have just read, what are some ways parents, teachers, society and peers can help to give people the best chance of having high (or at least not low) self-esteem? Put one idea in each space.

How to Increase self-esteem:
- Seek therapy
- Eat healthy foods
- Exercise regularly
- Meditate
- Join a support group
- Connect with friends and family
- Volunteer
- Celebrate your strengths – not everyone is good at the same thing!

THE DEVELOPMENT OF SOCIAL BEHAVIOUR

Humans are social beings. We all, to one degree or another, need other people for social interaction, to provide physical comfort and to give emotional support. Social behaviour begins at birth and will make up a significant portion of our lifetime behaviour. **Social behaviour** is defined as any behaviour that is performed by members of the same species and that is influenced by others in some way.

One of the earliest social behaviours in humans is the smile. Reflexive smiles can appear in babies as early as the first month of life in response to stimuli like a full stomach, or having their cheek stroked. Psychologists believe that it is not until the second or third month of life that the social smile first appears. This smile can appear in response to another person, or can lead to a response in others, that is, social behaviour is bidirectional. Research has suggested that infants are not selective in their use of the social smile until around six months of age.

Another early social behaviour is crying. Like smiling, crying is initially a reflexive action that is related to survival, however as the baby grows their cries become a form of communication and are therefore a social behaviour. These early interactions between parents or caregivers and the baby can influence not only their relationship in later life but can form the basis of how the child will go on to interact with others as they grow. This is the idea of **attachment**.

ATTACHMENT THEORY

In psychology, attachment refers to the way in which we form relationships with other people and the way emotions are regulated in these relationships (Schmidt & Power, 2005). Attachment begins in infancy, and usually these bonds are formed with people who are deeply involved in the infants' lives, that is, mother, father, carers, grandparents, siblings, or other close family members. It plays an important role in a child's social development and emotional wellbeing, not only in childhood, but in their adult lives as well. The style of attachment formed by infants has even been found to predict school grades (Burton, 2018).

Attachment does not only occur in humans but occurs in the animal world too, although with animals it is referred to as Imprinting. Baby animals have been found to imprint on the first and most consistent being they come across, in some cases, it has been a human. Have a look at these examples:

Konrad Lorenz – Imprinting:
https://tinyurl.com/yybvsjcy

Wild turkeys imprinting on a human, BBC Earth:
https://tinyurl.com/bdcskj94

A minute and over, the Study of Imprinting:
https://tinyurl.com/bp9683jb

Parents or carers are typically those who form the strongest attachment with the child, and it should be noted that it is not unusual for infants to form a stronger bond with one specific parent or carer.

Our understanding of attachment has been informed by the work of a number of theorists, each of whom built on the ideas of those before. Three of the main contributors to this area are John Bowlby, Harry Harlow and Mary Ainsworth. Each of their contributions is discussed in more detail below.

Much of what we know about attachment stems from studies undertaken by British psychologist and psychoanalyst John Bowlby (1907-1990) who first presented a theory of attachment in the 1950's following research conducted with orphaned children in the post-World-War II period.

Defining attachment as "the lasting psychological connectedness between human beings" Bowlby (1969) believed that each child has an innate need to bond with a key attachment figure and that the child should receive care from this attachment figure for the first two years of their life.

Bowlby believed attachment included three important elements:
1. Proximity seeking to a preferred figure
2. The 'secure base' effect
3. Separation protest.

That is, that children will seek to be near the person to whom they are most strongly attached. It is this attachment that forms a secure base from which they can explore the world. The child will then, if separated from

this 'secure base' protest the separation if the attachment has been formed securely.

Following on from this work Mary Ainsworth (1987) undertook numerous studies on attachment and further developed our understanding of how it can differ between infants and the implications of this for future behaviour of the child. One investigation, known as the 'Strange situation' showed that there were differences in the way infants reacted when their main carer (their mother) left. The differences in these reactions led to the development of the idea of Attachment Styles. These styles, or the pattern of attachment that develops between the main carer and the infant can predict any number of outcomes as the child grows, including their behaviour patterns and how they go on to form relationships as adults themselves.

HELPFUL ONLINE RESOURCES

Strange Situation Video:
The Strange Situation, Mary Ainsworth, 1969 | Development Psychology:
https://tinyurl.com/ms77zs4p

Based on her research, Ainsworth presented three attachment styles: **Secure attachment, Ambivalent—insecure attachment, and Avoidant insecure attachment**. This work was then built upon by other researchers including Duschinsky and others (1982) who added a fourth style; **disorganised-insecure attachment**.

THE 4 TYPES OF ATTACHMENT STYLES

Attachment styles	The child's general state of being	Mother's responsiveness to her child's signals and needs	Fulfilment of the child's needs (why the child acts the way it does)
Secure attachment	Secure, explorative, happy	Quick, sensitive, consistent	Believes and trusts that his/her needs will be met
Avoidant attachment	Not very explorative, emotionally distant	Distant, disengaged	Subconsciously believes that his/her needs probably won't be met
Ambivalent attachment	Anxious, insecure, angry	Inconsistent, sometimes sensitive, sometimes neglectful	Cannot rely on his/her needs being met
Disorganised attachment	Depressed, angry, completely passive, non-responsive	Extreme, erratic: Frightened or frightening, passive or intrusive	Severely confused with no strategy to have his/her needs met

3.2.12: The four types of attachment styles.

CULTURE AND ATTACHMENT

Much of the attachment research was based on research with Western populations. One of the most cited studies that examines the attachment from a cross-cultural perspective was conducted by Takahashi in 1990. Read the article here: Takahashi, K. (1990). Are the key assumptions of the "Strange Situation" procedure universal? A view from Japanese research. Human Development, 33(1), 23–30. **https://tinyurl.com/2p8wfr87**

SCIENCE INQUIRY SKILLS - CHECK YOUR UNDERSTANDING

Now you have read the article above, answer the following questions:

1. What type of study was this?

2. Who were the participants?

3. What was the procedure that was followed?

4. What were the findings of this study?

5. Were these findings the same as those discovered by Ainsworth and others? Explain your response.

6. Could Takahashi's study have been improved? Justify your statements.

Another part of Bowlby's theory was the idea of **maternal deprivation**. This is the idea that if the attachment bond to the mother is removed it can lead to irreversible mental health consequences in later life. He came to this conclusion based in part on information from a study of 44 juvenile thieves he had conducted in the 1940's. The study found that 39% of the thieves had not formed a strong maternal attachment, whereas only 4.9% of the control group had not. Related to this is the concept of **maternal privation** which is the absence of the mother from the beginning, rather than the removal. To clarify: Maternal deprivation refers to the removal of an attachment figure that was already in place. This should be distinguished from maternal privation, which is the absence of something that is needed.

SCIENCE INQUIRY SKILLS - CHECK YOUR UNDERSTANDING

Read Bowlby's 44 Thieves study – find it here:
https://tinyurl.com/yuxs9s57

1. What type of research was it?

2. What were the findings? Summarise them in your own words.

3. Critique this study – what was done well? What areas could be improved in a future replication of this study?

These links between the deprivation of a strong attachment figure and poor life outcomes in terms of physical, intellectual, emotional, and social development have been supported by subsequent researchers (see Holmes, 2014). All of whom support the idea that the formation and maintenance of a strong attachment to one caregiver from very early in life is vital to support normal child development. However, what has become clearer is that this initial attachment does not necessarily have to be the mother, rather the development of a strong and well-maintained attachment to one figure is what is important.

Alongside Bowlby and Ainsworth's work is that of Harry Harlow (1905-1981), an American psychologist who designed and undertook research projects to determine if infant rhesus monkeys became attached to their mothers due to solely their proximity and the fact that they fed them, or if there were other factors involved in the attachment formation. One part of his research involved the creation of two 'mothers'; one made entirely from wire, the other made from wire but also covered in a soft cloth. Through a number of studies, he found that the babies consistently preferred the 'soft' mother, irrespective of whether it provided the food or not. He concluded therefore that the provision of food and proximity were not the only contributors to the development of attachment, rather that a sense of warmth and comfort was also needed (Harlow, 1958).

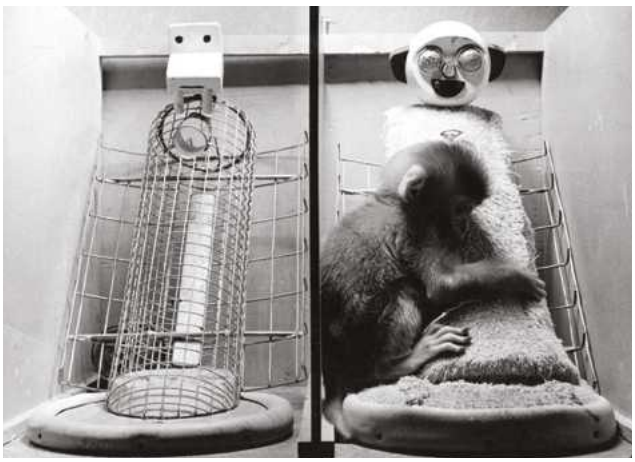


Figure 3.2.13: One of Harlow's baby Rhesus monkeys with the wire and cloth 'mothers'.

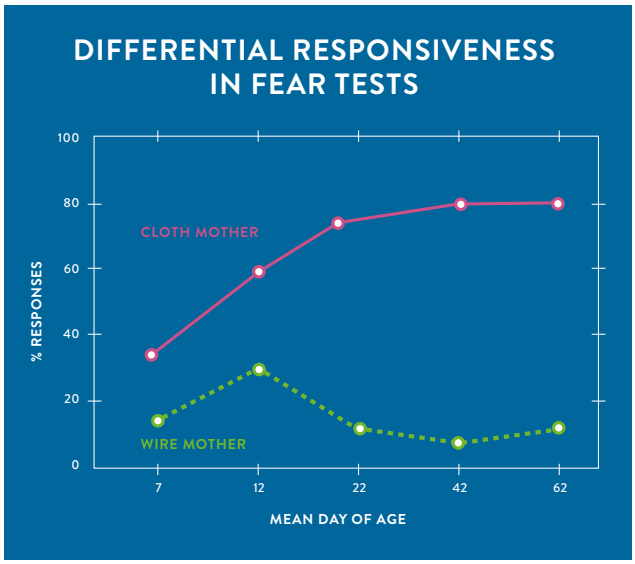


Figure 3.2.14: Harry Harlow's 1958 findings re cloth vs wire mother (Harlow, 1958).

Each of these theories and theorists have been re-examined and cited in numerous studies over the years. Whilst updates and alterations have occurred as our understanding changes, the importance of developing secure attachment and its resulting impact on behaviour across the lifespan remains clear.

SOCIAL DEVELOPMENT IN OTHER CULTURES

It is important to note that social development occurs differently in different cultures. For example, Australian's First Nations peoples view family and social development differently to many western cultures. Family and the related idea of kinship play an incredibly important role in the development of first nations children. Whilst there is not the scope here to do justice to this topic, briefly, First Nations peoples view the concept of family much more broadly than do western cultures. The related concept of kinship refers to not only biological family, but how each person is related to and should interact with others in the community. Or to say it another way, kinship is not only intertwined with biological family but is much more complex and includes how people are related through other means including marriage, their attachments to country and through social norms and hierarchies. Watch the following YouTube video to help clarify:

https://tinyurl.com/3epa6z94

3.3 METHODS OF INVESTIGATION IN LIFESPAN PSYCHOLOGY

- Lifespan psychology may be studied using qualitative, quantitative, cross-sectional, and longitudinal designs, which vary in validity.
- Describe ethical considerations in the study of lifespan psychology, and in the application of the findings.
- Cross-sectional studies often include twin and adoption studies.
- Longitudinal studies follow the same group of people over an extended period, observing changes in behaviour that occur at different ages.

2023 Subject Outline | Stage 1

Methods of investigation

Research in the area of lifespan psychology can be tricky. How exactly can we tell what infants understand before they are able to tell us? How do we explain differences between people when we can't really control the environments they live in or the different genetics that people bring? How do we know then if it is the genetics or the environment that is leading to the developmental changes? As you can maybe tell from some of the studies mentioned here already, it creates difficulties that researchers have utilised creative solutions to solve.

Studying the behaviour of animals that are biologically close to humans is one way of trying to figure out human behaviour. Examples like Harry Harlow's rhesus monkey experiments mentioned previously, or the work of Konrad Lorenz, where he showed that baby birds would 'imprint' on the first being they see and follow it, allow us to see how humans might develop in particular circumstances. However as closely related to some members of the animal kingdom as humans are, we are not the same. Finding other ways to study human development was necessary. There are two main investigation designs that have been used by lifespan researchers to do this, **longitudinal studies**, and **cross-sectional studies**.

Longitudinal studies occur when researchers look at the same group of participants at different points in their lives. For example, they might study a group of babies at 6 months of age, then again when they are 2 years old, 5 years old, 10 years old, 15...etc. This type of study is helpful because we can document changes that occur for each individual and compare any similarities or differences across the participants. This type of study examines the different behaviours and development at each data collection point, allowing the researchers to develop an understanding of behaviours common to all participants at each time point, thereby increasing our understanding of how and when humans develop.

CHECKING FOR UNDERSTANDING

Watch the YouTube video: Lessons from the longest study on human development | Helen Pearson https://tinyurl.com/2wxxm3t8
Complete the table with the elements from the Biopsychosocial model identified in the YouTube presentation above.

BIOLOGICAL	PSYCHOLOGICAL	SOCIAL

One such study is the Growing Up in Australia Study (Australian Government, 2000). Beginning in the year 2003, it is a major study that is following the development of 10,000 young people and their families from all parts of Australia. It is being conducted by the Australian Government, the Australian Institute of Family Studies and research company Roy Morgan. It is examining a large number of different research questions, not only those related to psychology, including the areas of health, family functioning, non-parental childcare, education and cross discipline questions. Data are collected from two groups of participants every two years. The first group was aged 0-1 in 2003-4 (n=5000) and the second group was aged 4-5 (n=5000). At each time point data are collected from the young person, parents and/or carers and their teachers. The study has also, with permission of the participants, gathered data from other databases including NAPLAN, Centrelink and Medicare.

Originally the study was examining 14 specific research questions, including: "What are the impacts of family relationships, composition and dynamics on child outcomes, and how do these change over time?". The questions were sound for the original study that was collecting information about children, however in 2015, a review of the questions was undertaken as the researchers knew that the participants would shortly be transitioning into adulthood and wanted to capture more specific and relevant information. One of these updated questions is: "What are the nature and impacts of early family composition, relationships and dynamics on the adult outcome domains, and how do these relationships and their effects change over time?". This study is ongoing, as of January 2023, Wave 10 of the data collection has begun. If you would like to know more have a look at the following website: About the Study |Growing Up in Australia: **https://tinyurl.com/mr36268y**

SCIENCE INQUIRY SKILLS - CHECK YOUR UNDERSTANDING

Validity and Longitudinal studies
In groups discuss the validity of longitudinal studies. Specifically:
External validity – can the findings be generalised to people outside the study?
Internal validity – is the study measuring what it is trying to measure?
Share your responses with the class.

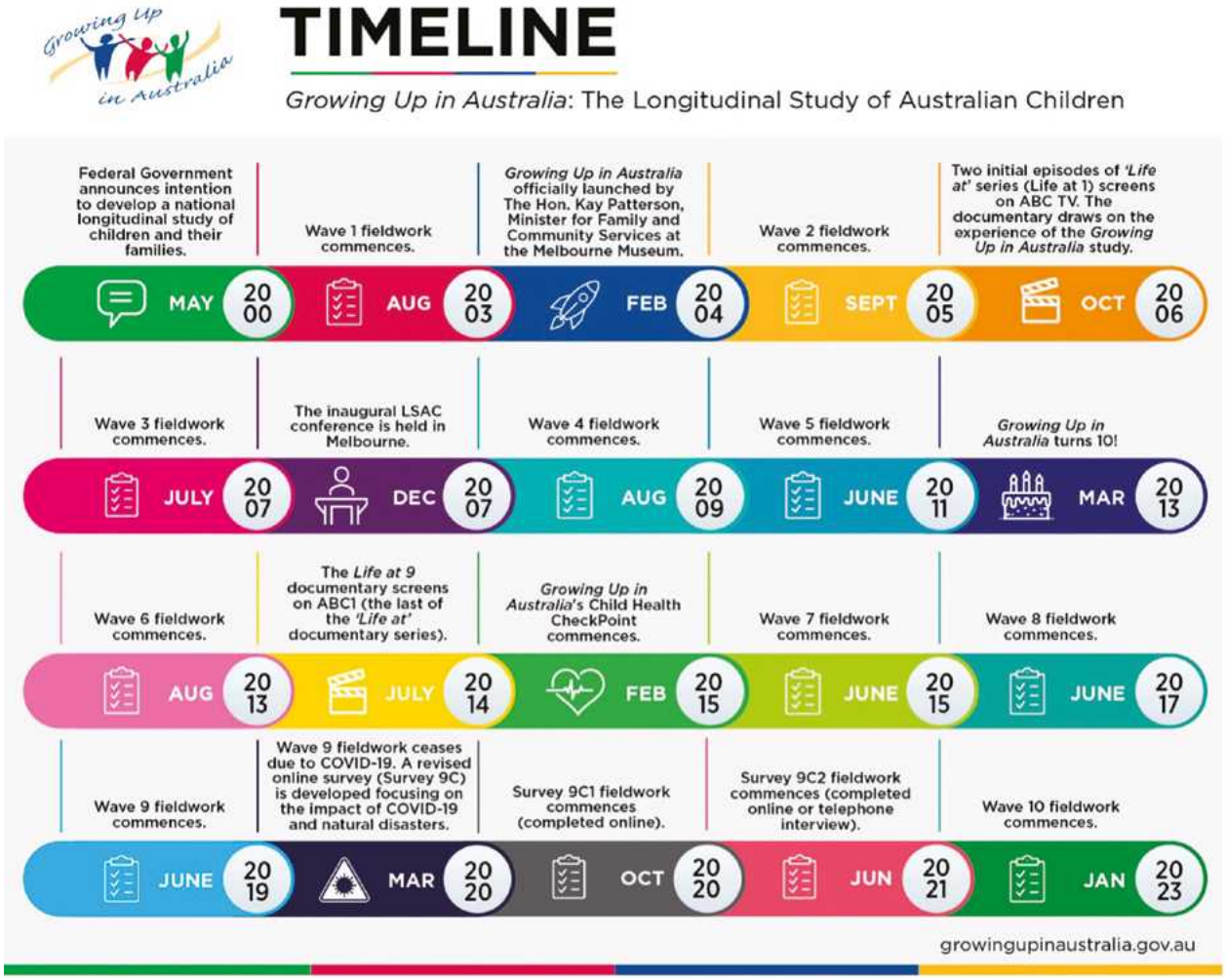


Figure 3.3.1: Growing up in Australia Research Timeline.

CLASSROOM ACTIVITY - FURTHER READING:

Colorado Adoption Project: **https://tinyurl.com/y7nzv4f3**

The Colorado Adoption Project is another Longitudinal study of behaviour development conducted by the Institute for Behavioural Genetics at the University of Colorado in the USA. It is different from the Growing up in Australia study as it looked at behaviour development in children who had been adopted. This allowed researchers to examine the impact of the environment on child development (nurture) alongside of their genetics (nature).

Participants completed a number of tests across multiple data collection points and this data has been used to inform numerous research papers in the years since the study began in 1976.

CHECK YOUR UNDERSTANDING:

Read the information on the website link above and summarise the main findings below:

Cross-sectional studies also study participants at different ages, however, unlike longitudinal studies, they study different participants in each age group at the same time. This type of study allows the examination of differences between age groups, e.g., 50-year-olds compared to 20-year-olds. However, while a study can give us good general information across age groups, it doesn't give us very specific information about the changes that occur as an individual ages. Extraneous factors can have a significant impact on findings in this type of study.

One example of this type of research is that conducted by Brent Donnellan and Richard Lucas (e.g. 2008). They have conducted a number of studies into personality and whether or not changes in personality are evident at different ages. One study examined two large data sets from Germany and Great Britain. They included data from more than 30,000 participants ranging in age from 16 to their mid-80's. In examining differences, particularly as they relate to the key personality traits and differences, they found that as people aged, their levels of extraversion and openness decreased, whereas their level of conscientiousness increased (Donnellan & Lucas, 2008).

CLASSROOM ACTIVITY - CROSS-SECTIONAL STUDY

On September 26th, 2024, a group of scientists gather a group of 10, 000 participants. In that larger group, there are five sub-groups. Each sub-group includes a particular age range.

Answer the following questions with a view to studying social development:

- What could the subgroups be? Explain your reasoning.
- What are some important considerations when choosing your sub-groups?
- What are some example questions the researchers could investigate with this type of study design?

CHECKING FOR UNDERSTANDING

What are the advantages and disadvantages of cross-sectional studies?

ADVANTAGES	DISADVANTAGES

Another commonly used example of both cross-sectional and longitudinal studies are twin studies. Researchers have studied twins, both those who were adopted, and those who remain with their biological parents, as it provides great insight into the nature versus nurture debate. Will twins raised in adoptive families behave in the same way as those raised in their biological families? Do twins raised together behave the same as twins who have been adopted separately? There have been a number of studies that have examined this exact thing. Some of them have been conducted well, others have raised questions about the ethical behaviour of the researchers. In a **meta-analysis** of twin studies that was completed in 2015, it found that "on average, about 50 percent of individual differences are genetic and 50 percent are environmental" (Polderman, et. al 2015). This information was gathered from more than 2,500 twin studies that occurred between 1958 and 2012 and involved more than 2,000,000 pairs of twins.

RESEARCH ETHICS

As you should be well aware by now, the Australian Psychological Society Code of Ethics guides everything we do in psychology in Australia. There is an entire section within the code that governs research. Broadly, the Code of Ethics includes three General Principles:

- General Principle A: Respect for the rights and dignity of people and peoples
- General Principle B: Propriety
- General Principle C: Integrity.

Falling under General Principal B, research ethics requires that researchers take care to adhere to the code. It requires researchers to comply with any requirements outlined by the National Health and Medical Research Council (NHMRC), the Australian Research Council or Universities Australia, and these requirements include that researchers publish their results accurately and with confidentiality of participants in mind, and that they act in a manner to limit any possible foreseeable harm to participants. All research proposals must undergo strict vetting and be approved by one of the bodies mentioned above. This approval is based on adherence to the requirements of the Code of Ethics.

CLASSROOM ACTIVITY - RESEARCH ETHICS

Just because we can study things in particular ways, should we? As you will be well aware by now, Psychology is governed by very strict ethical guidelines, however this hasn't always been the case. Watch the film "Three Identical Strangers" and answer the question – "Is the learning we get from studies like this worth it? For whom?"
Write your notes below and present your response as required by your teacher.

CHECKING FOR UNDERSTANDING – RESEARCH ETHICS

There are several common ethical dilemmas in research, particularly in research into development as it involves children. Several are included below. Can you identify ways that each of these dilemmas could be mitigated? Justify your responses. Identify your own ethical issues and solution in the space provided below.

ISSUE	POSSIBLE SOLUTION	JUSTIFICATION
Consent from children – technically they aren't able to give consent		
What happens to the data if someone withdraws from the study?		
Children need to go through their parents to withdraw from studies		
Children may experience trauma or other ongoing consequences as a result of being in the study (e.g. they may assume there is something 'wrong' with them because they are involved in a study)		
Write your own		
Write your own		
Write your own		

3.4 CULTURAL CONSIDERATIONS IN LIFESPAN PSYCHOLOGY

- There are many theories of development. As the research underlying these theories has been mostly conducted in Western countries, the theories are not necessarily transferrable to other non-Western cultures.
- Knowledge of development throughout the lifespan in a range of cultures strengthens the understanding of how we develop as humans.
- Ethnocentric theories of development are not appropriate to the experiences of all individuals, such as migrants or those of multicultural backgrounds.

2023 Subject Outline | Stage 1

Cultural considerations

Much of what we know and understand about human development is centred around research conducted in the western world. This means that it is heavily skewed to what is now commonly referred to as WEIRD, that is: Western, Educated, Industrialised, Rich and Democratic. This is because much of what we know is based on research conducted in either Europe or North America. More and more the influence of culture, and the differences this leads to in human development is being acknowledged and studied. So, while what has been written in this chapter so far is based on research and evidence, we must remember that it is research and evidence that included a limited pool of participants from a cultural perspective.

Does that mean it is all wrong? Is it only people from Western countries who develop this way? The answer is maybe – more research is needed. It may be that there are some elements that are universal truths for all humans, however, the evidence for this is still being developed. It is, however, important for us to acknowledge the limitations to what we know. Even more important is to acknowledge the significant impact and influence that an individual's culture has on them, particularly on their cognitive, social and emotional development. It should further be noted that the research into our First Nations people is incredibly limited, and it is important that we understand and acknowledge our limited understanding in this space and the need for additional, culturally sensitive research.

The idea of cognitive and other skill development occurring through children being 'novices' and apprenticed to the 'experts' (adults) around them is one that appears in many cultures. How this occurs changes cross-culturally; formalised in some places through schools, but informal in others, like the child who returns home after formal school to aid in the fields on their family farm and learns from observation and practice how to be a farmer. How this plays out, and the extent to which a child's learning is formal or informal is very different in different cultures and countries.

CHECKING FOR UNDERSTANDING

Consider your own development. What skills do you have and how did they develop? Through formal schooling, or through observation and practice in your family and community? Can you also further divide it into the areas of the BPS model?

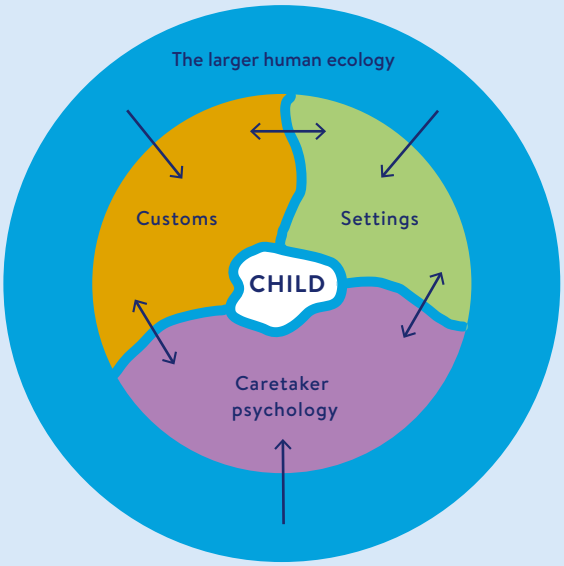
	FORMALLY DEVELOPED SKILLS	INFORMALLY DEVELOPED SKILLS
Biological		
Psychological		
Socio-cultural		

One way to understand development and culture's impact, particularly on cognitive development, is the work by Super and Harkness (1986) around the idea of **The Developmental Niche** (TDN). Super and Harkness describe that TDN consists of three major subsystems which operate together in a larger system that influence child (and therefore adult) development. Outlined below, each of these subsystems were found to have a profound impact on how children in each of the cultures that Super and Harkness studied developed.

CLASSROOM ACTIVITY

Modern approaches incorporate ideas of culture and multiculturalism into their research. How do you think that psychological researchers could incorporate some of these into their research around human lifespan development?

Design a research study that focuses on one of these areas, what are some of the things you would need to consider if you were going to conduct your study? How would you manage any ethical considerations?



TDN Subsystems explained:

1) Physical and social settings
   a. Family type
      i. Mother primary carer?
      ii. Child primary carer for younger siblings
   b. Family activities
      i. Weaving clothing
      ii. Planting and weeding crops
      iii. Watching TV
2) Culturally regulated customs and practices of childcare and child rearing
   a. How different cultures approach child rearing
3) The psychology of caretakers
   a. How parents and carers thing about children, families and themselves as parents

Figure 3.4.1: The Subsystems of TDN.

TDN framework asserts that similarities in social and physical settings, and in the practices of childcare, carry cultural meanings, and that it is these cultural meanings which influence child development. One example of this, was the idea of independence that influences the American culture. This part of American culture impacts child rearing practices in many ways, one example is that of infant sleep management. Infants in America (and in Australia) are often placed in a cot on their own to sleep, thus beginning the pathway to independence. Other cultures, however, engage in co-sleeping practices, where parents and children all sleep together and the focus is less on independence. Many of these cultures believe that co-sleeping fosters closeness and is an important way of bonding as a family (Owens, 2004). Which pathway new parents choose will be influenced by many things, however, the cultural practice that parents remember from their own childhood will play an important role in the choice of infant sleep management.

CLASSROOM ACTIVITY

1. What are some of the cultural practices that your family engages in? Is individuality valued? Is the sense of community? Is it a combination of both?

2. Watch the Netflix show "Old Enough!" and answer the question below:
https://www.netflix.com/title/81506279
How are children viewed in your culture? Are they encouraged to be independent and make their own choices? Or are children expected to adhere to family rules?

3. Choose two cultures that are different to your own, undertake some research and compare and contrast the child rearing practices in each culture. What similarities are there? What differences?

CHOSEN CULTURE	SIMILARITIES	DIFFERENCES

OTHER AREAS OF CULTURAL DIFFERENCE

Whilst limited, there has been some research undertaken into areas of cross-cultural differences related to human development. Some of these areas of research have been mentioned above, and include differences in parenting styles, attachment styles and the impact of individualist versus collectivist cultures on child development. Individualistic cultures, including Australia, the United Kingdom and the United States focus on the development of individuals who have a strong sense of themselves and the emphasis is on personal needs within relationships, rather than the collective good.

Collectivist cultures on the other hand, for example our First Nations people, focus more on the ties between and responsibilities to broader community units, rather than the individual. Members of collectivist cultures are encouraged to view themselves as interdependent with other community members, rather than as an individual operating alone within a larger group.

3.5 TECHNOLOGY, SOCIAL MEDIA AND DEVELOPMENT

- The online nature of some social interaction in contemporary society has impacts on the development of children and adolescents. These impacts can be either positive or negative.
- Advances in technology and social media affect developmental changes in children and adolescents.
- Online technology is used for the improvement of motor skills, memory, and other skills. Technology is also used to maintain knowledge and skills in older people, such as those with dementia.

2023 Subject Outline | Stage 1

Technology, social media and development

The pace of technological advancement is increasing exponentially. That's good, right? It gives us new and amazing ways to do things. Over the last 50 years, the way that we communicate, do business, learn, access entertainment, and organise ourselves has changed drastically. No longer must we wait until we get home or find a pay phone to make a call but can ring home with a few touches of a phone screen. Research used to be limited to libraries and printed books, whereas now most people carry the power of the internet with them. Medically, advances in technologies now allow us to see inside bodies more clearly than ever before, helping doctors and specialists to diagnose conditions with more accuracy and earlier. Sounds great right! And it is, but as with most things in life, there are two sides to every story. Technological advances at this speed can bring some difficulties along with these fantastic changes.

How has the advance in technology impacted human development? Below is a table outlining the Helps and Hinderances that technology can cause in each area of development we are examining here. In a paper written for the OECD in 2019, Gottschalk acknowledged that research in this area is still in its infancy. However, a common theme for much of this research seems to be that too much of a good thing is harmful, that is, overuse of technology, and therefore under engagement in other things is problematic for everyone for a variety of reasons (Gottschalk, 2019). Gottschalk's findings can be viewed here: https://tinyurl.com/bdhf7ksy

Table 3.5.1 Technological impact on areas of development.

PHYSICAL		COGNITIVE		SOCIAL		EMOTIONAL	
Helps	Hinderance	Helps	Hinderance	Helps	Hinderance	Helps	Hinderance
• Fine motor skill development • Hand eye coordination development	• Poor neural development • Text neck • Sway back • Poor muscular development • Poor sleep • Sleep deprivation • Insomnia • Eye strain • Reduced physical activity • Headaches • RSI	• Develop visual motor skill • Assists with multi-tasking	• Reduces attention span • Reduces school performance	• Can allow interaction for those separated by long distances	• Have created methods of communication (such as texting) which lack meaningful exchanges. • Has limited children's ability to utilise and interpret body language, tone and other aspects of non-verbal communication. • Has caused a sense of de-individuation which leads to online trolling and behaviours that would not be performed in a face-to-face context.	• Can improve decision-making abilities • Can provide a platform for discussing emotional issues with others.	• Reduce children's levels of self-awareness • Reduces children's ability to self-regulate, increasing impulsivity • Reduces social skills • Reduces empathy • Stunts motivation • Inhibits emotional reactions to other stimuli

CLASSROOM ACTIVITY

Watch this video: How Technology Affects Child Development –
Bing video https://tinyurl.com/aru63vr6
Reflection: What are the key points from this video – do you disagree with anything? Who created this video? Is it based on evidence? How can you tell?

Now watch this video: How Media & Technology Affects Child Development (amazon.com)
https://tinyurl.com/2zc76xb6
Reflection: What are the key points from this video – do you disagree with anything? Who created this video? Is it based on evidence? How can you tell?

POSSIBLE SHE TASK - INTERNET ADDICTION:

Are we creating a generation of internet addicts?
Internet addiction disorder affecting toddlers | 60 Minutes Australia
https://tinyurl.com/43dktwry

Influence Concept:
The use of psychological knowledge may have positive, negative, or unexpected consequences that require monitoring, assessment, and evaluation. The use of psychological knowledge must take into account risks and ethical considerations.
Discuss how technology can impact child development, both positively and negatively.

CHECKING FOR UNDERSTANDING

Is talking to someone online the same as talking in person? Why or why not? How are they different? How are they the same?

TECHNOLOGY AND HOW IT CAN HELP

As our population is aging, the instances of degenerative conditions associated with age such as Dementia and Alzheimer's disease are increasing. There are many ways that advances in technology can help in this space including things as simple as programmed reminders for tasks and medications to current studies investigating the use of robots to support people with Dementia at home.

CLASSROOM ACTIVITY

Read this article and investigate the website below and consider the ways that technology can support older persons, either to prolong their time in their own home, or to further assist staff in supported aged care accommodation:

Article: How Technology Can Support Dementia Care | Psychology Today Australia
https://tinyurl.com/4dy49vts

Website: Dementia support and learning experiences using technology | Dementia Australia
https://tinyurl.com/4w92nc7x

Technology is also being used in a variety of ways to support child development. Whilst the use of technology with children is an area that includes a number of areas of debate and controversy, carefully managed, technology can support child development. Examples of ways it can be used include game-like apps helping children to develop their phonological and phonemic awareness, the beginning of the reading journey, and can also positively impact hand-eye coordination. There are also concerns that whilst technology can be helpful, too much use can have significant negative impact on child development, including the development of fine motor skills and the shrinking of children's attention span.

POSSIBLE SHE TASK

Conduct your own research into technology and its impact on human development. Based on your research, and using one of the SHE concepts below, answer the following question:

Development and Application Concept:
- The application of psychological understanding can enable scientists to develop solutions, design actions, and evaluate and respond to economic, sociocultural, and environmental factors.

Influence Concept:
- The use of psychological knowledge may have positive, negative, or unexpected consequences that require monitoring, assessment, and evaluation. The use of psychological knowledge must take into account risks and ethical considerations.

Discuss how technology can be used to enhance the lives of older Australians. OR Discuss the ways that technology can be used to improve child development.

TECHNOLOGY'S IMPACT ON INDIVIDUAL DEVELOPMENT

Personality, goals, political views, and spending patterns can all be impacted by social media and the online environment. Social media allows social interaction on a global scale, which is wonderful for fostering and developing cross-cultural understandings. Most people are aware of the algorithms that power many social media tools and the negative impact this can have on the breadth of knowledge and sources that appear in a person's feed. Type in (or mention aloud) that you like kittens and it seems that everything in your feed suddenly involves kittens and cats in some way. This may seem relatively harmless in this example, however I'm sure you can see that it could lead to a narrowing of people's focus and thoughts which may not be helpful around some topics. What if you were

doing a research task for History on the rise of Nazism, for example, and then suddenly your feed was full of Neo-Nazi propaganda? If you read enough of anything you might start seeing a positive side to it, or at least want to give it the benefit of the doubt. It can become very difficult for some people to extract themselves from an online rabbit hole when they get stuck.

Of particular concern to many is the negative impact that social media can have on the emerging sense of self-esteem for young people. High levels of use of online social networking have been found to have negative impacts on psychological wellbeing broadly, and more specifically on symptoms of anxiety, depression and disordered eating patterns (various authors cited in Faelens, 2021).

It should also be noted, however, that social networking sites can also increase feelings of social support and can limit feelings of isolation for some young people (Putnam, 2000).

The rise of the 24-hour news cycle has had significant impact on the world. Having the (usually) negative stories associated with the news fed to us continuously can impact our stress levels and trigger symptoms like trouble sleeping. The COVID-19 outbreak, for example, led to people wanting to remain up to date with what was occurring, which can be necessary, however if you are bombarded by a constant stream of negativity, it becomes toxic. Many psychologists recommend a balance, limiting the viewing of news programs or reading news sites to a defined period each day, and then returning the following day for an update.

CLASSROOM ACTIVITY

Try limiting something in your online world for a day, what do you notice? Does your mood improve? Get worse? Why do you think this happens? Tip: If you think your mood might get worse, maybe give those around you a heads up!

‘Fake News’ of false and misleading news is usually created to manipulate public opinion in some way. By its nature, it is therefore designed to provoke some kind of emotional response. Not only that, but when we recognise that it is ‘fake’, it can lead to feelings of anger and frustration, particularly if we feel powerless to be able to recognise the fakes immediately. Reminding ourselves to think rationally and not emotionally in the face of emotive news (fake or real) and to check and verify the sources of information can be difficult, but it is an important step when trying to manage all the news input in our modern lives.

FIGHTING FAKE NEWS – STRATEGIES TO HELP

- Don’t believe everything you read
- Check your sources
- Check your biases
- Keep your sense of humour
- Channel strong feelings
- Take some time away

CYBERBULLYING AND DEVELOPMENT

In the digital world, cyberbullying and its wide-ranging impacts and implications have been well documented and described by journalists and news reports. The scientific evidence about the impact of cyberbullying is growing, with many researchers interested in exploring the reasons for it, the impacts, and more importantly, possible interventions to not only support the victims, but to stop the perpetrators. From a child development perspective, what we know is that bullying of all kinds, but particularly cyberbullying has a substantial impact on an individual’s mood, their social interactions and can cause issues at school (Tokunaga, 2010). It has also been well documented that people who would not engage in ‘traditional’ bullying behaviours, will do so online due to the anonymity offered by the online environment (e.g., Englander, 2006). Cyberbullying has been described as opportunistic, in that it results in harm without physical interaction, and reduces the threat of being caught. Although this suggests that cyberbullying is not premeditated, it should be noted that it certainly can be.

If children and young people become the victim of cyberbullying, particularly during their development when they still don't have a fully formed understanding of who they are as a person, the impact of this negative input can be catastrophic. If you see and hear constantly that you are a horrible person, and in this 24-7 world it can be constant, it is bound to have an impact on your development and understanding of who you are. If a person is already feeling concerned about something, for example they have concerns about their body, or think they aren't as intelligent as others, cyberbullying can be particularly impactful. It can help to cement these negative ideas in their own minds and make changing them incredibly difficult. It has been suggested that working in primary schools to support children to develop positive **self-concept**, and to reinforce the idea that everyone is different could be a powerful **protective factor**.

CLASSROOM ACTIVITY

Develop a program to be used with primary aged children to support the development of positive self-concept and to celebrate difference. What would you do? How? What type of support would you need? How could it be delivered, and the ideas reinforced?

CHILDREN'S UNDERSTANDING OF ABSTRACT CONCEPTS: PRIVACY IN THE ONLINE WORLD

In many ways, privacy in the real world is simple, if you want to have a private conversation, sit privately with a friend with no recording devices and have a chat. In the online world, where recording what is occurring is so easy, the idea of privacy becomes more challenging. Similarly, the idea and processes of ownership and sharing content, for example, photos, recordings and artworks in the pre-digital age was also simpler. The ideas of privacy and ownership in the online environment can be difficult for adults to manage. Can children understand these ideas of privacy and ownership in the digital world? How does children's still developing understanding of abstract concepts influence their understanding of these things, and in turn, the choices they make about potentially

sharing things online? Dr Susan Gelman and her team at the University of Michigan have spent the last 20 years exploring these and other concepts. Topics like: "How do children think about illness?" and "How do we foster kindness and compassion in children?" have become areas of interest for her team. The abstract ideas of 'illness' and 'compassion' can be difficult to understand. Developing our understanding of how children see these concepts can not only help us to deepen our knowledge of child development but can also give us insight into how we might help children to develop their understanding of these and other abstract concepts.

CLASSROOM ACTIVITY

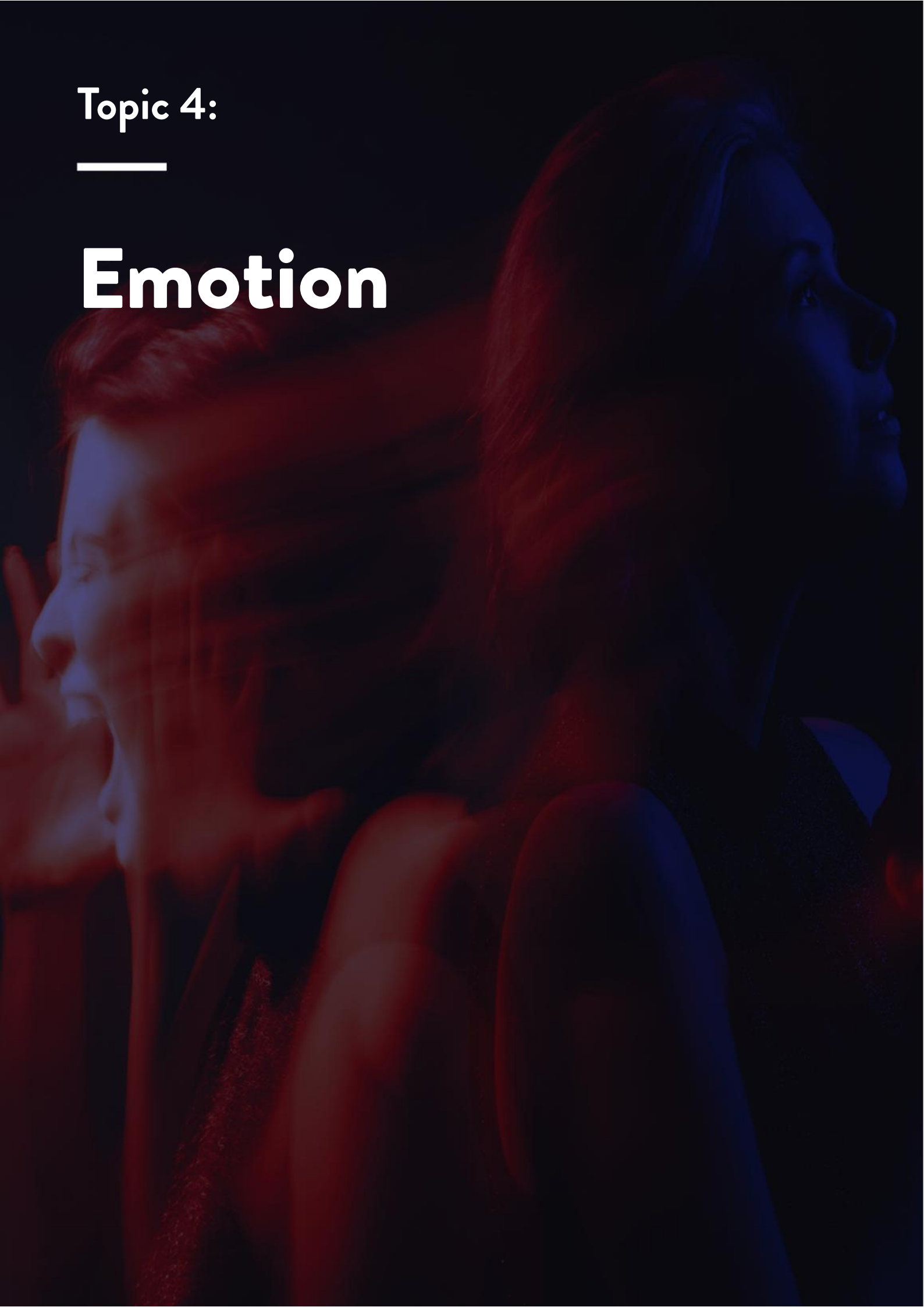
Interested in Dr Gelman's research? Read more here: Dr. Susan Gelman | Heinz Werner Distinguished University Professor of Psychology and Linguistics
https://tinyurl.com/3fmy7b6f

What are your key understandings from this reading?

In summary, lifespan psychology examines the development of humans from birth through to death and attempts to explain how changes in human understanding and behaviour occur. While there have been many theories presented to explain development, much of the research and the resulting theories have been based on western cultures and ideas. Further research into other cultures, including Australia's First Nations People is lacking and is an area of current and continued research and consideration.

Topic 4:

Emotion



4.1 THE COMPONENTS OF EMOTION

- While there are different theories about how emotion is experienced, psychologists believe that emotions are subjective experiences that are made up of the same three components:
  - physiological responses
  - subjective feelings
  - expressive behaviour.

2023 Subject Outline | Stage 1

Emotion is commonly defined as the reaction one has to an event or situation. The type of emotion experienced depends on the circumstances that trigger it. Emotions are an integral part of the human condition, guiding our choices and influencing our careers, friendships and decisions. We know when we 'like' or 'dislike' something. We recognise fear as a warning that something is wrong. Guilt alerts us to possible wrongdoing and the need for restitution.

Experiencing our own emotions allows us to comprehend the emotions of others. We are usually able to predict what will cause another human happiness, sadness, fear or excitement. This empathy leads to the development of relationships and effective communication, allowing humans to bond over shared experiences and understanding.

Emotion is complex. There is currently no consensus on a definition – instead, there has been a multidisciplinary approach to elucidating the function of emotion as an experience, the changes emotion causes within the body and brain, and the way emotion is expressed.

Figure 4.1.1 Emotion assists bonding.

Some explanations of emotion focus strictly on the neurophysiological changes – how the nervous system functions in the experience of emotion, especially in response to fear and stress. PET scans and MRIs provide evidence that the brain responds differently when involved in the coordination of various emotions. In an evolutionary sense, the experience of emotion was used to motivate survival behaviours and therefore maintain the viability of a species. The link between human behaviours and motivating emotional states has been considered by some of history's greatest philosophers, including Plato, Aristotle and Descartes.

Emotion has also been studied through a cognitive lens, suggesting that the brain's perception of behaviour informs the experience of emotion.

While terms such as 'feelings' and 'mood' can sometimes be used interchangeably with 'emotion', psychologists do agree that emotion is more complicated than just a change in how someone feels.

Emotion is commonly defined as the simultaneous experience of a physiological response, subjective feeling and expressive behaviour.

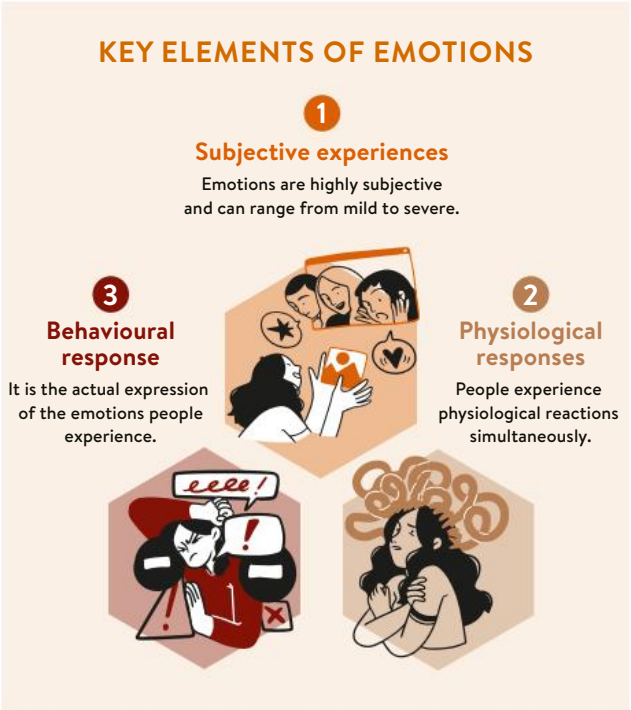


Figure 4.1.2 Key elements of emotions.

Physiological responses

Experiencing an emotion causes the brain to coordinate changes within the body. The autonomic branch of the peripheral nervous system responds to emotion by either increasing or decreasing arousal, causing changes in physiological functions such as heart rate, blood flow, sweating and digestion.

It is widely understood that emotions are accompanied by changes within the body – and that these changes are relatively constant across humans. For example, sadness is characterised by tight muscles and a churning stomach, while happiness causes a reduction in the excretion of cortisol as well as improved digestion and lower blood pressure.

Some other physiological changes that occur in response to emotion include the hairs on the back of your neck standing up, or the skin forming 'goosebumps'. Both of these responses are due to the phenomenon of **piloerection**, the involuntary contraction of small muscles at the base of hair follicles. The stimulation of these muscles is caused by a sympathetic nervous system response to fear and can be recognised in both humans and animals. Many people experience a red face when they are nervous or embarrassed, commonly known as blushing. This is caused by the release of adrenaline into the blood stream, which prompts blood vessels to dilate, allowing greater blood flow to the face. It has been suggested that blushing is a display of appeasement – a sign of vulnerability used to maintain peace after an argument occurs or a mistake has been made. However, the fact that the increase in blood flow is obvious when it occurs in the face has led some scientists to suggest that blushing holds a social advantage as well as a physiological one – that a red face may act as a defence mechanism developed to avoid a potential confrontation.

A rush of **adrenaline** can also cause the body to shake, commonly related to the emotion of fear. Adrenaline causes muscles to increase their rate of contraction, leading to uncontrollable twitching. This shaking can continue after a threat has passed, while adrenaline remains in the bloodstream. Intense anger or excitement can also cause this response.

All of the aforementioned examples discuss how the body responds immediately and visibly to the experience of emotion. However, many of the impacts of extreme or ongoing emotional states are long-term changes to how the body functions. Studies have found that long-term anger or stress can increase the likelihood of mental health conditions such as anxiety, as well as contribute to disorders such as high blood pressure, cardiovascular disease and stomach ulcers. Poor anger management has also been linked to digestion problems, insomnia and eczema.

Ultimately, when experienced intensely, emotions cause an increase in action of the sympathetic nervous system which directly influences physiological structures. A psychological 'feeling' must cause a physiological response to be considered an emotion.

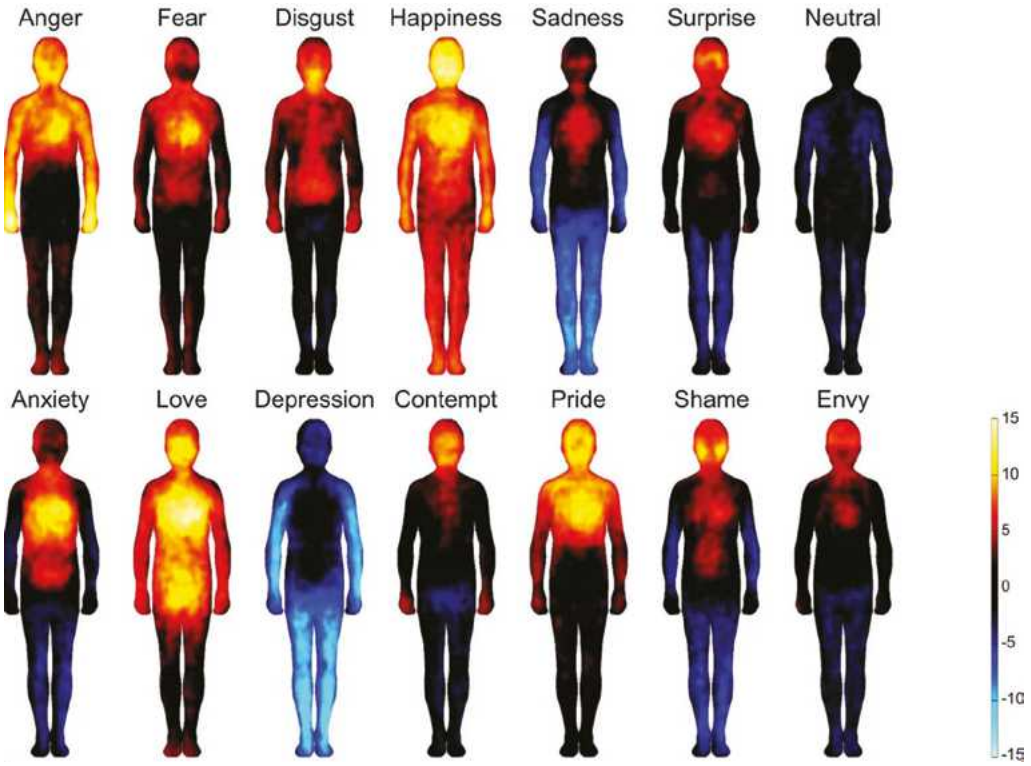


Figure 4.1.3: Hot colours show regions that people say are stimulated during the emotion. Cool colours indicate deactivated areas.

CHECKING FOR UNDERSTANDING

1. **Choose an emotion and explain the physiological changes that occur in your body when you experience it.**

2. **Explain the social value in recognising and interpreting emotions in others.**

3. **State a physiological change that occurs in response to a long-term emotional state.**

HELPFUL ONLINE RESOURCES

Investigate how emotions are mapped within the human body.
https://tinyurl.com/5n6u9byc

Subjective feelings

Subjective feelings in psychology refer to an individual's personal, internal experiences and emotions. These are experiences that are not easily observable by others but are known only to the individual themselves.

Subjective feelings can include a wide range of emotions, such as happiness, sadness, anger, fear, and excitement. They are subjective because they are unique to each individual and are based on their own interpretation and perception of a situation or event.

These feelings are often influenced by a variety of factors, including personality, past experiences, and current circumstances. They can also be influenced by biological factors, such as hormones or brain chemistry.

In psychology, subjective feelings are important to understanding human behaviour and mental health. Researchers often use self-report measures to assess subjective feelings and emotions in individuals, which can help to identify patterns and inform treatment approaches for conditions such as depression and anxiety.

It is important to make the distinction between **mood** and **emotion**. The American Psychological Association defines mood as 'any short-lived emotional state, usually of low intensity'. Emotions require a stimulus to evoke them, while moods do not. For example, receiving a high grade on a test may cause the emotion of happiness, while a happy mood may be experienced without apparent cause.

Research has been conducted into the simultaneous experience of positive and negative emotions, where the subjective feelings of Western and Eastern cultures were considered and compared. In general, people born in and living in Eastern cultures tend to exhibit a positive correlation between negative and positive emotions, indicating they experience mixed emotions (Perunovic, Heller, & Rafaeli, 2007) while those from Western cultures were less likely to report the ability to experience simultaneous emotions. The researchers suggested that Westerners feel less comfortable experiencing both a negative and positive emotion at the same time, and so worked to resolve the situation so that one emotion was felt with considerably more strength. Conversely, Eastern cultures, especially those considered collectivist, where focus is on the society rather than the self, are believed to accept negative emotions more readily, and recognise that they are not directly tied to one's sense of wellbeing.

Much research has also been conducted into how subjective feelings can be regulated. **Evocation** is used to purposely bring forward the experience of an emotion, while **suppression** is used to hide or conceal one's feelings. Certain types of therapy work to intentionally evoke emotions so that they can be experienced and transformed in a safe environment. This is usually a method of psychotherapy utilised when negative emotions have been suppressed and contribute to distress and mental health issues. This type of therapy is called **emotion-focused therapy** and is used to assist individuals in recognising their emotions and identifying healthy ways of coping with them.

Figure 4.1.4: Emotion focused therapy helps patients experience subjective feelings in a healthy way.

Expressive behaviour

Expressive behaviours in psychology refer to nonverbal behaviours or actions that convey emotions or feelings. These can include facial expressions, body language, gestures, tone of voice, and other nonverbal cues.

Expressive behaviours may be conscious or unconscious forms of communication. For example, we often choose to smile at one another to demonstrate positive regard, purposely using facial expressions to represent emotion. However, occasionally our true feelings may be made apparent unconsciously – when we cross our arms without thinking, or our brow furrows to show anger.

Figure 4.1.5: Facial expressions are a type of expressive behaviour which may be conscious or unconscious.

Facial expressions are widely understood to be the most common and easily recognised form of expressive behaviour. They are a primary means of communication, conveying the emotional state of one human to another. Facial expressions are caused by the movement of muscles beneath the skin, which cause eyes to widen, cheeks to lift and brows to crease.

Charles Darwin was the first to suggest that the expression of emotion was evolutionary – being passed to humans from our animal ancestors. Indeed, there are definite similarities in the way humans and apes show emotion through facial expressions. This theory suggested that emotions were unlearned and innate.

Darwin also theorised that babies were born with the ability to create facial expressions that they had not yet witnessed in others. This further supported the theory that the way emotions are expressed is instinctive and could be linked to communication needed for survival.

American psychologist Paul Ekman is a pioneer in the study of emotions and how they are expressed as facial expressions. Ekman conducted cross-cultural studies on facial expressions to examine whether emotional expressions are universal across unique cultures. He travelled to different parts of the world to study the expressions of people from diverse cultures and backgrounds. Through his research, he found that certain expressions, such as happiness, anger, disgust, fear, surprise, and sadness, are universally recognized and displayed in the same way across different cultures.

Ekman also developed a system called the **Facial Action Coding System** (FACS), which is a tool for identifying and categorizing facial expressions based on the movements of specific muscles in the face. FACS is used by researchers and clinicians to measure and analyse facial expressions in a standardised way.

Ekman's research with the Fore people of Papua New Guinea was focused on the universality of emotions and facial expressions. Ekman wanted to determine if certain emotions were universally recognized across cultures, or if emotions and expressions were culturally specific.

Ekman travelled to Papua New Guinea to study the Fore people, who were isolated from Western culture and had not been exposed to Western media. He showed them photographs of various facial expressions and asked them to identify the emotions being expressed. Ekman found that the Fore people were able to accurately identify emotions such as happiness, sadness, anger, and fear, which supported the idea of universal emotions and facial expressions.

Ekman's research with the Fore people was ground-breaking because it challenged the idea that emotions and facial expressions were solely a product of culture.

HELPFUL ONLINE RESOURCES

Watch this clip to identify chimpanzee facial expressions and behaviours.
https://tinyurl.com/496t937z

Instead, it suggested that emotions are a part of our biological makeup and that facial expressions associated with those emotions are universally recognized.

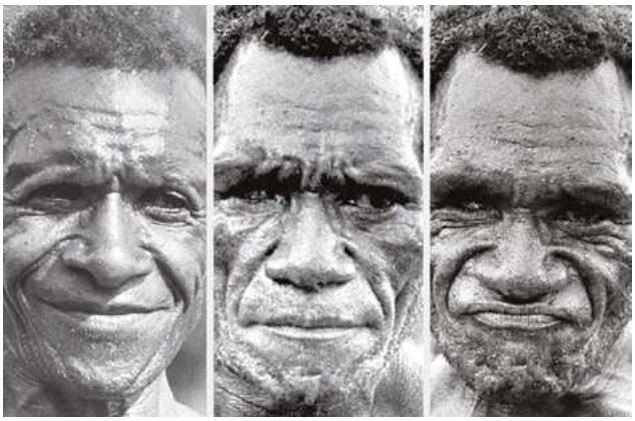


Figure 4.1.6: Ekman's study of the Fore people demonstrated that some emotions, and thus facial expressions, are universal.

CLASSROOM ACTIVITY

Ask your partner to begin with a neutral, resting face and then create the facial expression of fear.
Record how the structures of their face change – especially the eyes, cheeks, mouth and eyebrows.

Paul Ekman's research led to his identification of six **universal emotions**: happiness, sadness, fear, surprise, disgust and anger. Each of these emotions has an associated facial expression that is expressed and recognized across the world. As Ekman continued his research, he added a seventh universal emotion: contempt.

When someone expresses the emotion of surprise the same physiological changes are seen – the brows arch, eyes open wide to expose more white, and the jaw drops slightly. Ekman's research demonstrates that, regardless of culture or social norms, these seven emotions and the facial expressions that accompany them are universal – recognized all over the globe.

Figure 4.1.7: The facial expression of surprise: arched brows, wide eyes, open mouth.

Microexpressions

Both expressive behaviour and physiological responses can be used in the process of lie detection. Ekman's work extended to the consideration of **microexpressions**, involuntary facial expressions that are only experienced for a split second. Microexpressions occur when the conscious control of a facial expression is interrupted by the involuntary emotional response performed by the body. The amygdala in the brain initiates a response based on the emotion experienced. When we wish to conceal our true emotions, a microexpression occurs – a very brief appearance of the authentic emotion, followed quickly by a false expression to cover it.

Microexpressions occur very quickly, lasting less than half a second, which means that they cannot be consciously controlled. It also means that they are difficult to notice – unless you are highly trained, or record someone's face and replay it in slow motion. Both of these strategies are used in some elements of crime solving, by experts in the field who are skilled in the recognition and analysis of microexpressions and the emotions they portray. Recognition of microexpressions related to disgust, fear or surprise may provide insight into the true emotions of a criminal, victim or witness. However, research has

found that microexpression analysis in crime solving has led to wrongful conviction of suspects, especially when the interrogation process was aggressive or lengthy.

Figure 4.1.8: The detection of microexpressions in crime-solving is the premise of the television show 'Lie to Me'.

HELPFUL ONLINE RESOURCES

Watch Paul Ekman discuss his theory of universal emotions and facial expressions.
https://tinyurl.com/bdh3ver6

ACTIVITY

With a partner or in a small group, discuss a scenario where the recognition of microexpressions may be helpful in solving a crime.

The polygraph machine

The **polygraph machine** is a device used to measure levels of emotional arousal, caused by the sympathetic nervous system. It is commonly referred to as the 'lie detector'; however, the instrument detects changes in arousal levels rather than actual lies. Instead, they work on the premise that deceptive behaviour causes physiological changes to occur.

Essentially, the polygraph machine combines a number of medical devices that monitor arousal, including heart rate, breathing rate, blood pressure and electro-dermal activity. Electro-dermal activity refers to **galvanic skin response**, a measurement of how well the fingertips conduct electricity based on sweat gland activity.

The polygraph machine measures changes in arousal due to stress. While stress may occur due to lying, this is not always the case. Arousal could also be heightened due to surprise, shock or fear. Imagine being arrested and hauled down to the police station, where you are asked to undertake a polygraph test. Your anxiety may very well register as deception, due to the increase in heart rate, blood pressure and sweat secreted. This is referred to as a **false positive**, when deception is detected despite the participant providing honest responses. In fact, research suggests that there is a 50% chance that a polygraph will determine that an honest person is 'lying', and will often provide **false negative** results, when deception is not detected, and a liar is not caught out. For this reason, polygraph results are inadmissible in court in Australia, and it is an offence to use a lie detector to establish whether a person is guilty of a crime. However, some American states still permit their use in criminal trials.

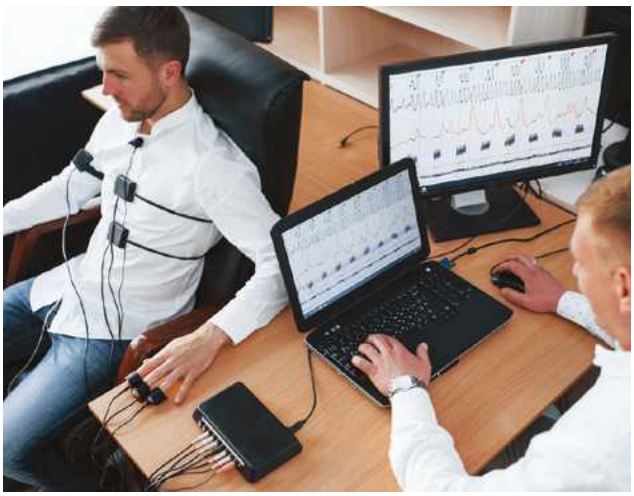


Figure 4.1.9: The polygraph machine measures change in physiological arousal, which may indicate deception.

Two types of questions are used in implementing the polygraph. **Control questions** ask the participant about their past behaviours that may relate to the reason they are under interrogation. An example of a control question would be "have you ever physically harmed someone you love?" Control questions are used to establish a baseline level of arousal. When a **relevant question** related to the investigation is asked, the operator would expect to see an increase in arousal compared to that shown on the control. Interestingly, innocent people tend to show higher levels of arousal when asked control questions which may reveal a past wrongdoing compared to the relevant questions related to a crime they did not commit.

HELPFUL ONLINE RESOURCES

Can you beat a lie detector? Watch this video to find out!
https://tinyurl.com/ykwrtxe8

There have been many suggestions made about how one might 'beat' the polygraph machine. The most popular idea is to attempt to control levels of arousal by slowing your breathing and trying to stay calm.

Some criminals have admitted to purposely lying on control questions, to register a higher level of arousal as a baseline measurement. This means that their deceptive responses to relevant questions are not considered markedly different. This has also been achieved by purposely inducing pain during the control questions, by biting one's tongue, or having a nail in one's shoe.

Polygraph machines use computerized systems that record the output of the monitors and electrodes used to measure heart rate, blood pressure, breathing rate and galvanic skin response. Data is recorded as a series of peaks and troughs, where irregularities in amplitude and frequency indicate deception.

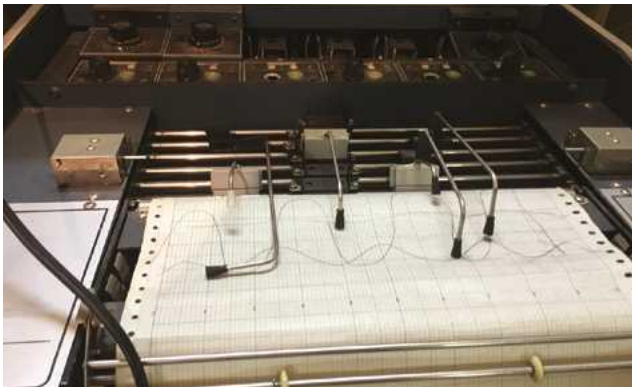


Figure 4.1.10: Older analogue polygraph machines recorded arousal via needles on scrolling paper.

CHECKING FOR UNDERSTANDING

For each of the statements below, select TRUE or FALSE.

	T	F
Subjective feelings are experienced by everyone in the same way.		
Physiological responses refer to changes occurring in the body.		
Emotional states can be long-term as well as short-term.		
Emotions require a stimulus to trigger them.		
Suppression refers to purposely bringing forward an emotion.		
Expressive behaviours are always conscious.		
Facial expressions are the most widely used form of expressive behaviour.		
Subjective feelings are easily observable.		
Sadness is a universally recognised emotion.		
A polygraph accurately measures if someone is lying.		
Control questions are used to determine a baseline level of arousal.		

ACTIVITY

As a class, decide on six questions that will be asked. Some examples are:

- What did you do on your last holiday?
- What is your favourite outfit?
- What is your earliest memory?

Choose questions that require an explanation, rather than just a single word answer.

Students should write down their answers to these questions – but deliberately lie on three of them.

Students then pair up and take it in turns to ask their partner each of the six questions – while carefully watching their body language and facial expressions.

Can they accurately determine which answers were truthful and which were deceptive?

ACTIVITY

As a class, watch the movie 'The Pursuit of Happyness' and, in the scenes featuring an intense emotional reaction, identify the

- Expressive Behaviour
- Subjective Feelings
- Physiological Response

Theories of emotion

JAMES-LANGE THEORY

The James-Lange theory (1885) was one of the earliest attempts to explain what causes the experience of emotion. Psychologists William James and Carl Lange both independently theorized that emotions occur as a result of physiological changes in the body, caused by a trigger.

These assumptions are based upon evolutionary theory – that emotions are experienced as a survival function and are used to assist humans in adapting to their environment.

Essentially, the James-Lange theory states that it is our interpretation of the changes within our body that causes the experience of emotion. For example, if you were faced with an aggressive dog which caused your heart to beat faster and your mouth to become dry, your brain would recognize these changes, and relate them to the emotion of fear. This would then cause the subjective feeling of fear to be experienced.

PHYSIOLOGICAL RESPONSE → SUBJECTIVE FEELINGS

William James explained, "My thesis is that the bodily changes follow directly the PERCEPTION of the exciting fact and that our feeling of the same changes as they occur IS the emotion."

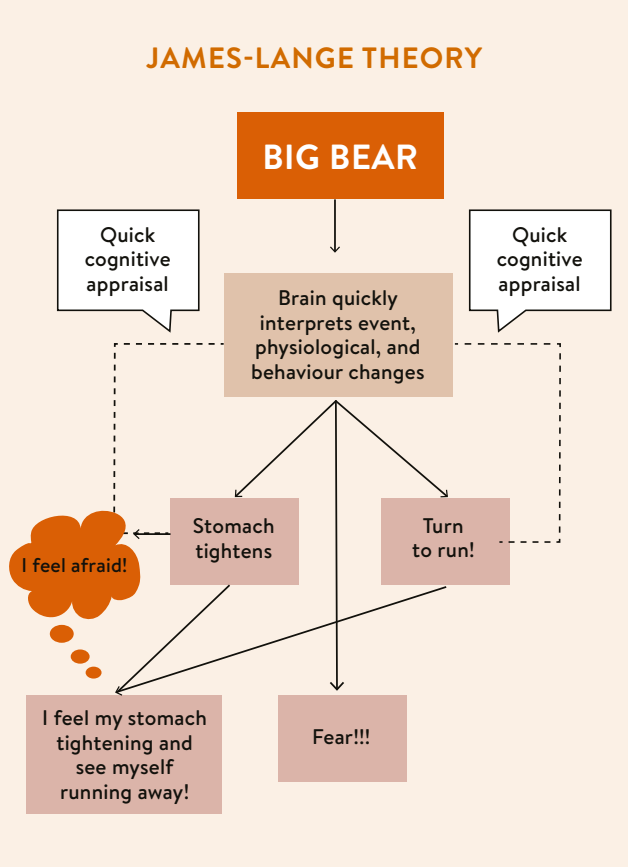


Figure 4.1.11: The James-Lange theory of emotion suggests that our interpretation of physiological change causes the experience of emotion.

The James-Lange theory recognizes the interplay of subjective feelings and physiological responses as two of the integral aspects of emotion. It suggests that the bodily response to the emotional trigger is instinctive and immediate rather than being conscious and controlled. This assumption correlates with what we now know about the action of the autonomic nervous system.

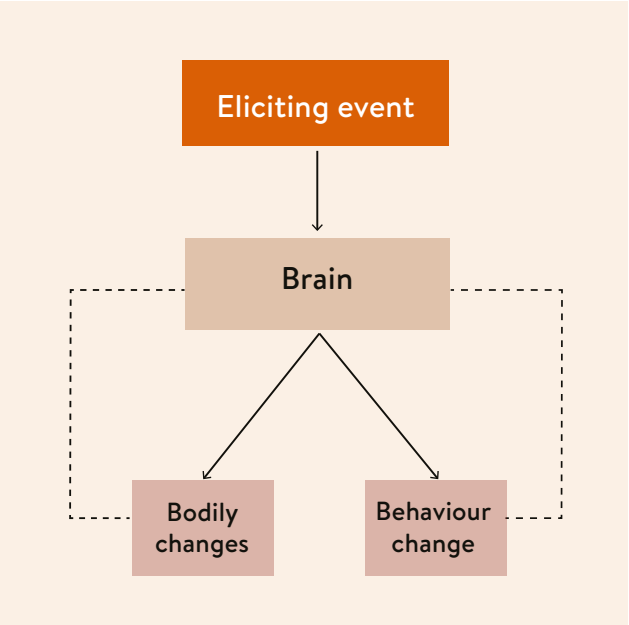


Figure 4.1.12: The event causes the brain to initiate physiological responses and behavioural changes.

However, the James-Lange theory is not without criticism. Cannon (1927) and Bard (1934) believed that we experience emotion subjectively at the same time that we experience it physiologically.

CANNON-BARD THEORY

The Cannon-Bard theory is also known as the Thalamic theory, due to the physiological control the thalamus has over the way we experience emotion. The theory states that the subjective feelings and the physical response occur both simultaneously and independently, causing the experience of emotion.

The **thalamus** is an area of the brain referred to as the 'relay station' due to its important role in directing sensory information to other brain structures for interpretation. In the case of emotional processing, it is the thalamus that activates the autonomic nervous system in response to the emotion experienced.

Figure 4.1.13: According to the Cannon-Bard theory, you experience the feeling of anxiety and the physiological changes associated with this emotion simultaneously.

Imagine that you are preparing to sit your Psychology exam at the end of the year. As you walk into the examination hall, you feel your heart rate increase and sweat under your armpits. The Cannon-Bard theory suggests that you would experience these physiological indicators of stress at the same time as experiencing the subjective feelings.

CHECKING FOR UNDERSTANDING

1. Explain the difference between the James-Lange theory and the Cannon-Bard theory.

2. Refer to image 4.1.12. Construct a similar flowchart for the Cannon-Bard theory.

SCHACHTER-SINGER THEORY

In 1962, Stanley Schachter and Jerome Singer presented the **two-factor theory of emotion**, referring to their proposed two key components of an emotion: physical arousal and a cognitive label. In simple terms, the Schachter-Singer theory states that the physical response to an emotion is experienced first, which the brain then 'labels' as an emotion. This cognitive 'labelling' is needed before the physiological changes can be correctly interpreted.

Consider this example: You have been driving a little bit too fast and suddenly you see the flashing lights of a police car in your rear-view mirror. Your heart rate increases, and you find it difficult to breathe. These physiological changes are labelled by the brain as 'fear', which you then understand to mean that you are scared of the approaching police officer and the possibility of a fine.

The Schachter-Singer model theorises that the experience of fear would have occurred according to the following sequence:

- The police officer is approaching.
- My heart is racing, and my breathing is shallow.
- My increased heart rate and difficulty breathing is caused by fear.
- I am scared.

This process begins with a stimulus. In this case, it is the approaching police officer. This causes the physical arousal of increased heart rate and shallow breathing. These changes are labelled as fear by the brain, which then causes the emotion to be experienced.

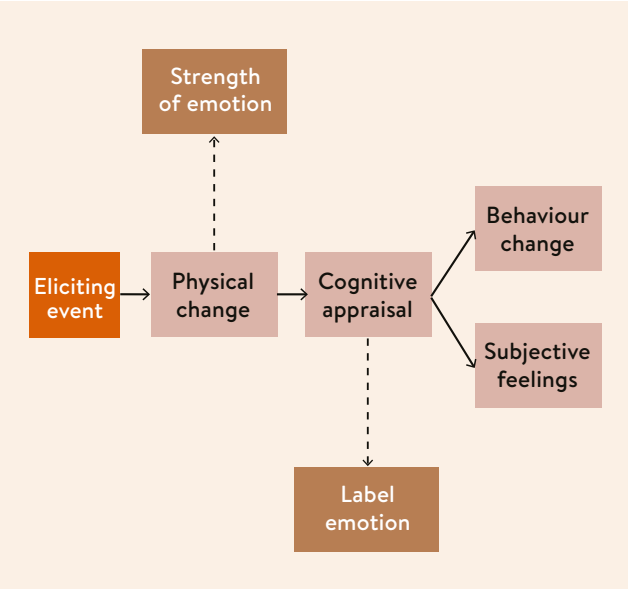


Figure 4.1.14: The Schachter-Singer model of emotion.

Schachter and Singer performed an investigation to test their theory. They used 184 male participants who were split into four groups and told that they would be administered an injection of vitamins before their eyesight was tested.

All participants received an injection – but three groups were injected with adrenaline, and the fourth group with a placebo. The three groups that received adrenaline were all informed of the side effects that may occur – but this information differed between the groups. Group 1 was correctly informed about the side effects of adrenaline – that they may experience an increased heart rate. Group 2 was also informed that they may suffer side effects – but were misinformed about what they might be. Group 3 was not given any warning about potential side effects.

Participants were asked to wait in one of two separate rooms. They believed that the other men in these rooms were fellow participants, when in fact they were confederates who worked for Schachter and Singer. In one room, the confederates acted angry, while in the other room the confederates acted happy.

Schachter and Singer found that the participants who had not been given any information regarding potential side effects commonly experienced the same emotions as those displayed by the confederates. Because they didn't know how the injection should make them feel, they deferred to the emotions someone else was experiencing.

The findings suggested that people can rely on the cues within their environment to interpret the emotions they experience. The confederate's performance caused the cognitive labelling of the emotion as an interpretation of the physiological changes occurring.

Since this initial study conducted in 1962, many replications of this experiment have occurred. However, much of this research did not yield the same results or witness significant emotional changes.

SCIENCE INQUIRY SKILLS

Consider Schachter and Singer's Experiment.

1. Provide one reason why this investigation is considered an experiment.

2. Explain the purpose of Group 4 being given a placebo.

3. What was the dependent variable in this investigation?

4. Explain why the reliability of these findings was limited.

PLUTCHIK'S THEORY

Robert Plutchik's theory of emotion is founded in his belief that there is an evolutionary basis for each of eight primary emotions: fear, anger, sadness, disgust, surprise, anticipation, trust and joy. Plutchik theorized that each of these eight emotions trigger behaviours essential for survival – such as fear initiating the fight or flight response. Plutchik's theory is referred to as the **psychoevolutionary theory of basic emotions**.

Plutchik's theory is based upon a number of key ideas, known as 'postulates', including:

- Emotions serve an adaptive role, allowing both humans and animals to respond to their environment to improve their chances of survival.
- There are eight basic, or primary, emotions.
- All other emotions are derived from the **primary emotions** and occur as combinations of them.
- Primary emotions have '**polar opposite**' emotions, which cannot be experienced simultaneously.
- Emotions have varying levels of arousal and intensity.

PLUTCHIK'S WHEEL OF EMOTIONS

Two-dimensional circumplex model

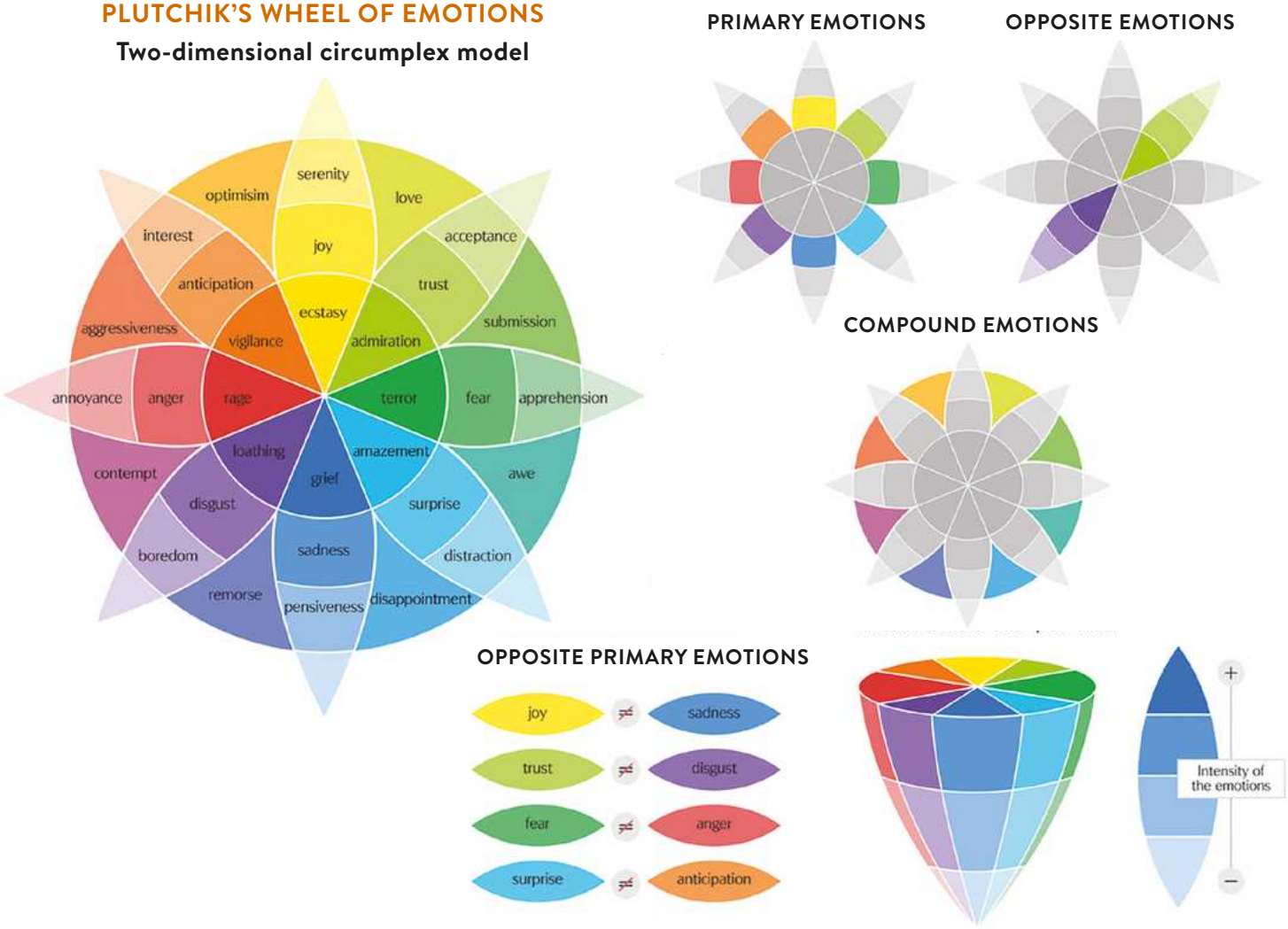


Figure 4.1.15: Plutchik's Wheel of Emotion – Two Dimensional Circumplex Model.

Plutchik constructed a Wheel of Emotions using different colours to represent emotional intensity.

Primary emotions are positioned around the 'core' of the colour wheel in such a way that they all sit opposite another primary emotion. Plutchik theorized that these emotions cannot be experienced at the same time. An example is disgust and trust.

The colours in the wheel are deepest in the centre of the colour wheel and become paler towards the outside. The darker colours represent more intense emotions while paler colours represent lower intensity.

- **Apprehension → Fear → Terror**
- **Serenity → Joy → Ecstasy**
- **Boredom → Disgust → Loathing**

Emotions that sit between the spokes of the colour wheel represent Plutchik's secondary emotions, which are sometimes referred to as compound emotions. These are a combination of the primary emotions on either side of them.

- **Joy + Trust = Love**
- **Anger + Disgust = Contempt**
- **Surprise + Fear = Awe**

SURVIVAL ISSUES

Organisims at all evolutionary levels face certain common functional survival problems.

STIMULUS EVENT	COGNITE APPRAISAL	SUBJECTIVE REACTION	BEHAVIOURAL REACTION	FUNCTION
Gain of valued object	Possess	Joy	Retain or repeat	Gain resources
Member of one's group	Friend	Trust	Groom	Mutual support
Threat	Danger	Fear	Escape	Safety
Unexpected event	What is it?	Surprise	Stop	Gain time to orient
Loss of valued object	Abandonment	Sadness	Cry	Reattach to lost object
Unpalatable object	Poison	Disgust	Vomit	Eject poison
Obstacle	Enemy	Anger	Attack	Destroy obstacle
New territory	Examine	Anticipation	Map	Knowledge of territory

Figure 4.1.16: Plutchik's primary emotions are experienced to aid survival.

CHECKING FOR UNDERSTANDING

Refer to Figure 4.1.15.

1. Give an example of how the primary emotion of trust could aid survival.

CHECKING FOR UNDERSTANDING

Refer to Figure 4.1.15.

2. Which secondary emotion is a combination of

a) Sadness and Disgust?

..

b) Disgust and Anger?

..

c) Trust and Fear?

..

3. Provide two examples of emotions, according to Plutchik, that cannot exist at the same time.

..

..

..

..

..

..

4. Create the three-step flowchart of the varying intensities of

a) Anticipation

..

b) Sadness

..

c) Surprise

..

5. In the word search below, find the emotions that: a) Are primary emotions. b) Are secondary emotions.

O A Y D Z O G I T A C N J A O
X N T S A D N E S S E S N N Z
H P D J S L L C D L U T A G G
E V O L Y T O E N I I R T E O
K V Z D W N S O O C S K T R Z
E K L O T I P E I M Q G F J S
J X H E R T W P S Y O J U Z Z
N C M P I A A Z S I R D R S C
C P R M Y T T W I G R A E Z T
T U I B I X S Z M L A Y M Z C
S S K O T G G I B F E D O L Q
M F N H C E V Y U D F S R D N
E A E O B F T V S I O V S G Q
E D I S A P P O I N T M E N T
S S E N E V I S S E R G G A D

4.2 THE BIOLOGICAL AND CULTURAL FACTORS OF EMOTION

- The main structures of the limbic system (hypothalamus, thalamus, amygdala, and hippocampus) each play an important role in emotional processing.
- Some basic emotions are universally recognised and understood; however, others differ based on cultural context.
- Culture can affect the way in which people display and interpret emotion. Despite different emotional display rules, our ability to recognise and produce most facial expressions of basic emotions appears to be universal.

2023 Subject Outline | Stage 1

The limbic system

The **Limbic System** refers to a series of structures within the brain that process emotions and coordinate emotional responses. It is composed of the **hypothalamus**, **thalamus**, **amygdala** and **hippocampus**. Each of these structures plays a unique role in the interpretation of emotion and the physiological response. The limbic system coordinates behaviours that are integral to survival, including the fight or flight response.

THE HIPPOCAMPUS

The human brain has a **hippocampus** in each hemisphere. It plays a vital role in the formation of **episodic memory**, a type of long-term memory that refers to the recollection of a personal experience that contains information about what happened and the context in which it happened. It allows us to recall and mentally re-experience specific episodes from the past, as well as the emotions that accompanied them. The hippocampus assists in the consolidation from short-term memory to long-term memory.

Episodic memories are important because they allow you to recall personal experiences that helped shape your life and perceptions. Each person's episodic memory of an event is entirely unique.

The hippocampus is also involved in the regulation of emotion, complemented by its role in memory formation. Emotion and memory are closely related, as memories often rely on the emotional experience that accompanied the event. There is a deep emotional connection between episodic memories and places.

THE AMYGDALA

The hippocampus receives information about emotion from the amygdala, which plays a role in the unification of emotion and memory. Studies have shown that the amygdala determines the importance to place on memories, by considering how a specific memory would aid survival. For example, it would be more important to remember a situation that caused fear, because the trigger could have been threatening to our safety and should thus be avoided in the future.

The amygdala is associated with the body's fear and stress response and is responsible for the 'distress signal' being sent to the hypothalamus to initiate 'fight or flight', causing the release of adrenaline from the adrenal gland, signaling the heart, lungs, pupils and blood vessels to alter their function to allow for a heightened level of arousal and possible action.

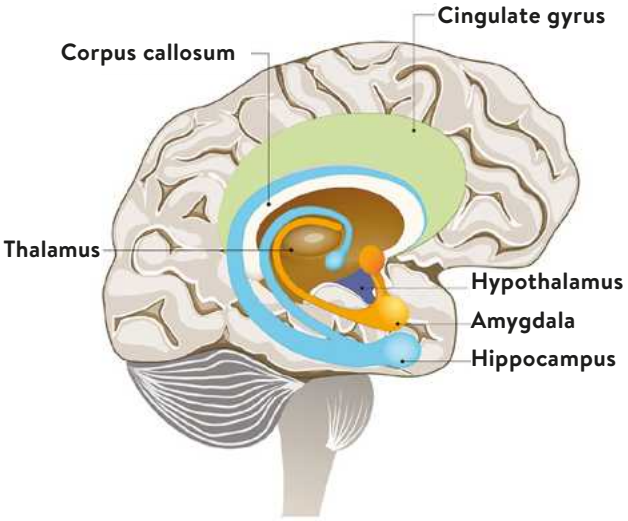


Figure 4.2.1: The Limbic System.

THE THALAMUS

The **thalamus** sits above the brain stem near the center of the brain and has a wide range of functions, including processing both sensory and motor input and transmitting it to the cortex. The thalamus contains many nuclei with specific functions, including the anterior nucleus which controls memory, emotion and behaviour regulation. It is also integral to the process of episodic memory consolidation.

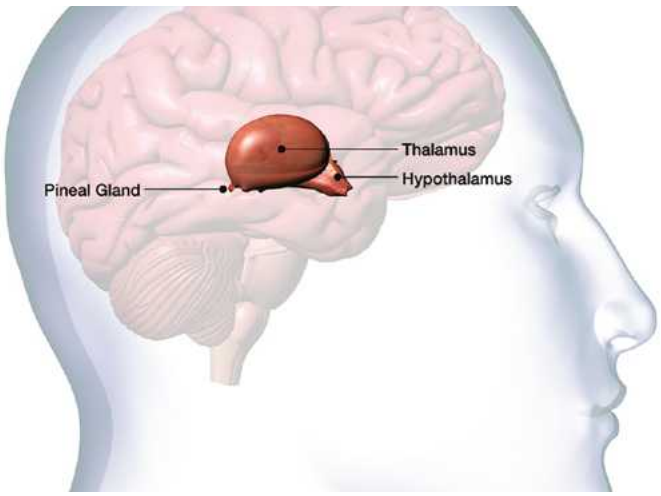


Figure 4.2.2: Location of the thalamus.

THE HYPOTHALAMUS

The **hypothalamus** is a tiny part of the brain that makes up less than one percent of its weight. It is the size of a pea and sits below the thalamus. Despite its small size, the hypothalamus is essential to many bodily functions, including working with the rest of the limbic system to regulate emotional responses. The hypothalamus is the structure that converts emotions into physiological reactions. For example, the experience of fear is generated in response to thoughts, perceptions or stimuli in our environment.

The hypothalamus responds to input from the amygdala by activating the adrenal gland to secrete both adrenaline and cortisol. Adrenaline triggers the 'fight or flight' response while cortisol works to maintain blood pressure and strengthens the body's anti-inflammatory processes.

DAMAGE TO THE LIMBIC SYSTEM

Damage to the limbic system causes a range of conditions that negatively impact the way emotion is processed, interpreted and remembered.

Damage to the hippocampus can cause amnesia, a disease that causes a loss of memory, including the recall of previous events and the emotion associated with them. Disorders such as Alzheimer's, epilepsy and depression can all cause the degeneration of the hippocampus.

Damage to the amygdala can be caused by stroke or traumatic brain injury. Patients can experience a range of emotional effects including anxiety, impaired decision making, memory loss and hypervigilance. Hypervigilance is often caused by lesions on the amygdala and may cause the sufferer to experience a perceived fear of others, specifically through the incorrect interpretation of facial expressions. Decision making becomes impaired, with many sufferers of injury to the amygdala taking risks and demonstrating impulsive behaviour. This occurs due to the amygdala no longer triggering automatic responses which identify threatening situations.

The most common causes of damage to the hypothalamus include traumatic brain injury, tumor, eating disorders, tuberculosis and inflammatory diseases. When the hypothalamus is unable to function effectively, there are significant impacts on the way emotions are interpreted and the subsequent responses demonstrated. One such symptom is known as **emotional lability**, when emotions are experienced quickly and usually easily, but are short-lived and can switch from one emotion to the next without warning.

Damage to the hypothalamus, or the wider limbic system, can also cause the sufferer to experience poorly controlled emotional responses, and even episodes of uncontrolled laughing or crying. These outbursts rarely occur due to a trigger and may not align with the emotion being experienced in the sufferer at the time. Similarly, the patient may suffer from angry outbursts and the inability to control their temper.

Traumatic brain injury has also been linked to constant feelings of fear that are out of proportion to the situation the patient is in. This is commonly known as anxiety and can lead to panic attacks occurring.

Figure 4.2.3: Traumatic brain injury can cause damage to the limbic system and difficulty controlling emotional responses.

HELPFUL ONLINE RESOURCES

Watch this clip titled 'Aggression, Violence and the Brain'.
https://tinyurl.com/hfy3aeu6

CHECKING FOR UNDERSTANDING

Provide a summary of the role of the limbic system in interpreting emotional triggers and coordinating suitable responses.

Figure 4.2.4: Appreciation is shown and responded to very differently depending on cultural norms.

Cultural differences

Paul Ekman's studies with the people of the Fore tribe in Papua New Guinea led to his conclusion that there are seven universally recognised emotions (happiness, sadness, fear, surprise, disgust, anger and contempt), for which the facial expressions are recognised across the world. However, it is worth noting that facial expressions are only one type of expressive behaviour, and the way emotions are expressed can vary considerably between individuals, even if the emotion is considered 'universal'.

There are some emotions that have significant differences in expressive behaviour, based on cultural norms. **Cultural norms** refer to social rules or expectations of behaviour based on shared beliefs within a certain cultural group.

An example is the emotion of appreciation. In Western culture, it is considered a social norm to give a gift to someone to show appreciation. Usually, the gift is opened immediately, in front of the gift giver, and thanks is offered, even if the receiver doesn't like what has been gifted to them.

However, in some Asian cultures, when a gift is offered to you, it is polite to refuse it many times, before finally accepting it. The gift should be taken from the giver with both hands and should only be opened when the recipient is alone.

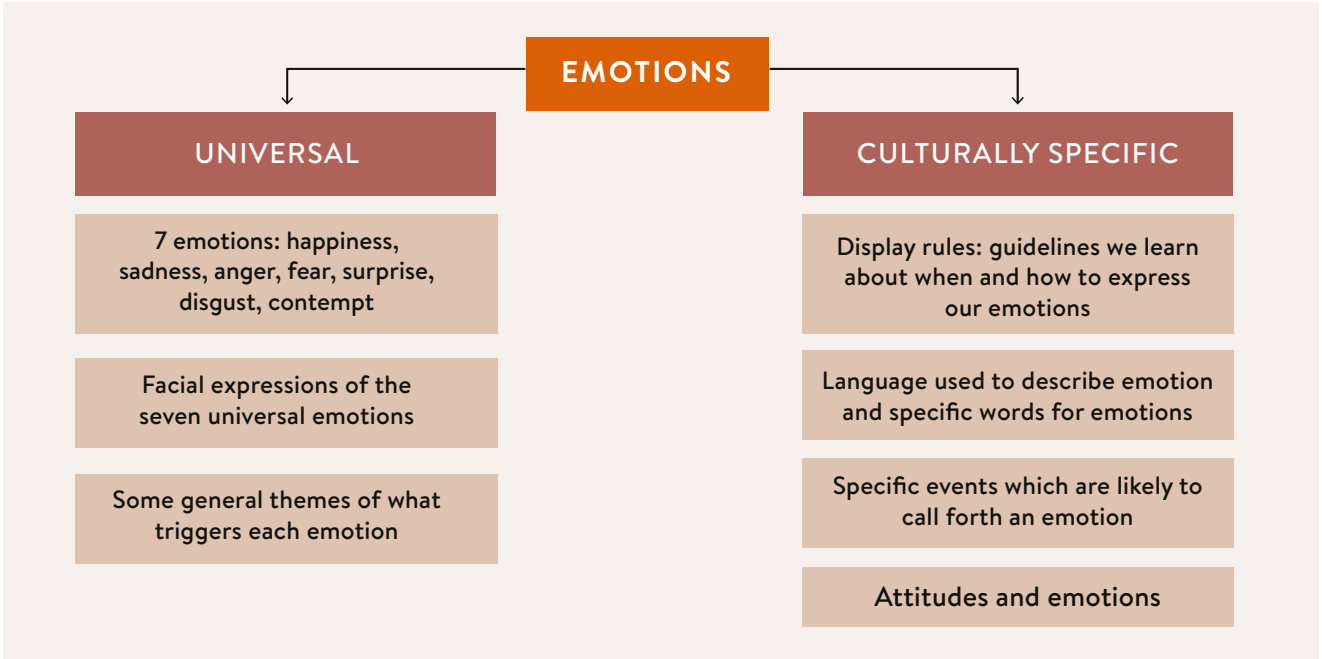


Figure 4.2.5: Some emotions are universal, while some are culturally specific.

Ekman theorised the phenomenon of **Display Rules**, a set of norms within a society or culture that dictate the way emotion is expressed, and with what level of intensity.

The vast majority of research into differences in emotional expression have compared Eastern culture with Western culture, specifically, East Asia and Northern America respectively. These regions are usually chosen due to the distinct differences between them, such as their geographic location, history, language and religion. As aforementioned, these countries also differ in their values and beliefs in regard to the self, versus the community. Eastern cultures are referred to as 'collectivist' where focus is on the needs of the group whereas Western cultures tend to prioritise the 'self'. Many of the research findings suggest that it is these models of 'self' that shape emotional responses.

For example, research conducted by David Matsumoto in 1990 found that individuals from the United States express negative emotions such as anger, disgust and fear both alone and in the presence of others, while Japanese individuals will only express these emotions while alone (Matsumoto, 1990). There have also been studies that suggest that gender plays a role in how emotions are expressed. Interestingly, Matsumoto's study also considered the type of culture his participants came from. Those who came from collectivist cultures, where the emphasis is on the community rather than the self, were more likely to suppress their emotions, to ensure that their response is suitable and aligned to that of those around them.

Jean Briggs was an American anthropologist who undertook an 18 month study of the Inuit population on the Arctic coast during the 1960s. She noted that expressions of anger were very rare, and if they did occur, the person who did demonstrate rage or aggression was ostracized from the larger group.

Earlier in this chapter, Emotion was defined as having three components: physiological changes, subjective feelings and expressive behaviour. Many cross-cultural studies into the way emotion is experienced and expressed has found more similarities than differences in the physiological changes that occur. Regardless of culture, people's bodies tend to respond to emotional triggers in the same way. However, the expression of emotion differed significantly.

A study entitled "Emotional expression and physiology in European Americans and Hmong Americans" was conducted by Taiwanese psychologist Jeanne Tsai and her colleagues from Stanford University in 2002. Her research considered the differences between European Americans and Hmong Americans, an indigenous group from Southeast Asia with a large presence in the United States.

Figure 4.2.6: Hmong Americans do not express their emotions as intensely as European Americans.

When asked to remember highly emotional memories from their lives, such as when someone died, or some other intensely emotional event, both groups demonstrated the same levels of physiological arousal. However, their expressive behaviour, especially in the form of facial expressions, differed considerably. When reliving events that elicited positive emotions, European Americans smiled more frequently and strongly than their Hmong counterparts, despite both groups reporting an equal intensity in their subjective feelings.

These differences are also demonstrated more widely. According to Kroeber and Kluckhohn (1952), cultural influences in the way emotions are expressed are also evidenced in children's storybooks. Books published by American authors and illustrators in the United States often contain content and images of characters experiencing intense and exciting emotions, while the best-selling children's storybooks sold in Taiwan feature much calmer emotional situations and expressions. It is worth noting that not only do individual emotions differ between cultures, but also does the intensity with which they are expressed.

CHECKING FOR UNDERSTANDING

Define 'Display Rules' and explain how they differ between Western and Eastern cultures.

While Ekman's research indicated that his seven basic emotions corresponded to universal facial expressions, a study published by the American Psychiatric Association in 2011 considered how they were perceived by people of different cultures.

Entitled "Internal Representations Reveal Cultural Diversity in Expectations of Facial Expressions of Emotion", the study investigated how individuals of Eastern and Western cultures think about facial expressions – and the results indicated that there are some unique differences.

While the recognition of an angry or sad facial expression tends to be universal, what people think about when asked to imagine emotion on a face, and the features that constitute the expression of a certain emotion, can significantly differ.

Head researcher Rachel Jack defined mental representations as 'interpretations of what emotional facial expressions look like in our mind's eye when we think about a fearful or happy face'. Mental representations are shaped by our past experiences and help us know what to expect when we are interpreting facial expressions (APA, 2011).

The participants in Jack's study were 30 residents of Scotland, 15 with a Chinese background, and 15 Caucasians. They viewed a series of computer-generated facial expressions which were based upon an initially neutral face with small changes made to various facial features to represent the universal emotions. Participants were asked to categorise each image as happy, sad, disgusted, angry, fearful or surprised. Jack could therefore determine which changes in facial expression contributed to the identification of each emotion.

Data obtained from this study indicated that Caucasians relied on changes in the eyebrows and the mouth to determine which emotion was being expressed. Conversely, the Chinese participants relied on the eyes.

Jack suggested that these cultural differences could lead to missed cues in interpreting the emotions of others. For example, the Chinese participants may miss small changes in the mouth (such as in the facial expression that represents contempt), causing possible misinterpretation of emotion. Similarly, people from Western cultures may rely too heavily on changes in the eyebrows and mouth and miss subtle changes in the eyes.

Another study by Yan, Young and Andrews in 2017 referred to individuals having an 'own-race advantage' in facial expression perception. Their research revealed slight differences in the facial expressions of Chinese and Caucasian people that were more readily recognised by participants of the same culture as the model. (Yan, X et.al, 2017)

Figure 4.2.7: Differences in the way universal emotions are expressed on the faces of people from different cultures.

CHECKING FOR UNDERSTANDING

Consider the research of both Rachel Jack and Yan, Young and Andrews.
Explain what is meant by individuals having an 'own-race advantage' when it comes to the interpretation of facial expressions.

Physical displays of emotion

While facial expressions are considered the most common way to represent emotion, there are many other physical representations of how we are feeling. These behaviours are known as **body language** and, unlike facial expressions, can vary considerably between cultures.

Body language refers to both conscious and unconscious movements, gestures and postures that provide information to others about our mood or emotions. It is a form of communication that can complement the spoken word or provide information about an individual's thoughts and feelings without the use of language at all. It is suggested that these non-verbal signals account for up to 65% of all communication.

Figure 4.2.8: Can you interpret the emotions of these women based on their body language?

Apart from facial expressions, eye movements, gestures, posture and body movements are also important elements of body language that reveal information about one's emotional state. Personal distance is another indicator.

EYE MOVEMENTS

We usually expect **eye contact** when we are having a conversation with someone – but did you know that there is a 'respectful' amount of eye contact? Researchers from Michigan State University suggest that we should use the 50/70 rule of eye contact when engaging in face-to-face conversation: eye contact is appropriate 50% of the time while speaking, and 70% of the time while listening. (Schulz, 2022). This study also recommends establishing eye contact immediately and maintaining it for 4-5 seconds at a time once conversing. Too little eye contact can be interpreted as disinterested or disrespectful, while too much may be considered threatening or aggressive.

Having difficulty maintaining eye contact could also indicate discomfort or distraction, or that one is trying to suppress their true feelings. Direct eye contact is often considered a sign of someone being open and honest.

Figure 4.2.9: Direct eye contact shows respect, confidence and interest in the other person.

It is important to note that eye contact display rules differ based on culture. The aforementioned 'norms' relate to Caucasian cultures but can vary significantly around the world. In many Eastern and some Caribbean cultures, direct eye contact can be considered rude or aggressive (World Economic Forum, 2023). Research into eye contact conducted by Akechi, H, et al. in 2013 suggested that Asians were more likely to regard someone demonstrating direct eye contact as aggressive or unapproachable compared to their Western counterparts. The study also concluded that the direction of gaze (whether one's gaze is direct or averted) influenced the perception of one's personality and disposition. (Akechi et al, 2013).

DISPLAY RULES IN INDIGENOUS CULTURE

The culture of our First Nations Peoples is one of the oldest in the world, dating back over 60,000 years. Aboriginal and Torres Strait Islander cultures utilise many distinct display rules in their communication and expression of emotion. Understanding these differences and the significance of display rules within Indigenous culture is essential to ensure respectful communication between parties.

In Aboriginal culture, it is polite to avoid eye contact. This is a significant difference to European Australian display rules. For First Nations Peoples, eye contact could be perceived as challenging or threatening. It is therefore important not to interpret a lack of eye contact during conversation as rudeness or disengagement. Increased levels of eye contact may be appropriate when conversing with Indigenous Elders.

The volume of verbal communication should also be considered. Quieter tones are often preferred over loud speech, which may be interpreted as hostile. Some researchers suggest that this is a remnant of colonisation, when white health authorities were aggressive and domineering in their orders towards First Nations Peoples.

Aboriginal people utilise sign language to accompany verbal communication. Unlike AUSLAN, which is a language used by Deaf people and their families, Aboriginal sign language is referred to as 'hand talk' and is used simultaneously with speech. Hand talk is also unique to each Indigenous community, with over 55 known variations nation-wide. It is an important element of Indigenous storytelling and is best learned and utilised when 'on country', a term that refers to the emotional and spiritual connection First Nations Peoples have with land and Place.

HELPFUL ONLINE RESOURCES

Watch this clip about Kukatja Hand Talk.
https://tinyurl.com/3t4zbhnr

GESTURES

Gestures refer to movements of the body, usually the hands or the head, to emphasise or express an idea or meaning. Gestures are a type of expressive behaviour and vary significantly between cultures.

We use gestures when counting, when signalling that someone should come closer, when expressing appreciation and when we are angry and want others to know! However, the gestures used to mean certain things in Australia are not used for the same purpose worldwide – in fact, some gestures have very different meanings. Even within our culture, gestures may be misinterpreted, as some have a variety of meanings depending on the context.

Placing the tip of the index finger to the tip of the thumb is a common gesture for 'that's great' or 'okay!' However, using this gesture overseas might get you in trouble, because in some cultures it implies something is 'worth nothing', or is considered an obscene gesture used only towards those that you hate.

Clenching the fist can represent strength or solidarity, but it is also frequently used as a sign of rage and aggression. Many Americans use their index finger and middle finger to create a 'V for Victory' symbol, which in some countries means 'Peace'. However, changing the direction the hand is facing, causing the palm to face inward, represents an offensive gesture commonly referred to as 'Up Yours!'

Another example is bending the index finger in a 'beckoning' motion. While Australians use this gesture to indicate someone should come closer, in Asia the same motion is only used towards dogs. Using this gesture in the Philippines can get you arrested!

Figure 4.2.10: Gestures vary between cultures.

BODY MOVEMENT

The arms, legs and head can all be used to portray emotion. Fingers can be tapped to indicate a lack of patience or frustration. Crossed arms or legs may suggest feelings of anger, discomfort or self-protection. Crossing one's arms is often a defensive aspect of body language, possibly with the evolutionary advantage of protecting the vital organs.

Additionally, some cultures are naturally more expressive in the way they use their hands while speaking. While some cultures find it acceptable to gesticulate enthusiastically, Japanese people consider excessive gesturing to be impolite.

In Australia, it is considered normal to sit on the floor, cross legged – especially for students in schools, or perhaps when relaxing on the floor of a living room. However, in Japan, sitting cross legged is considered disrespectful, especially in the presence of someone older, or in a superior social position. In the Middle East, allowing someone to see the bare soles of your feet is offensive, whereas many Caucasian cultures relax around their homes or at the beach without shoes.

POSTURE AND POSITION

Posture refers to how one holds their body. Examining someone's posture plays a significant role in the interpretation of their mood and emotion. It can also inform an observer about whether someone is feeling confident, passive, submissive or dominant. Two terms often used to describe posture are 'open' and 'closed'.

Open posture refers to the body being exposed, without arms held across the chest or legs crossed at the knee or the ankle. Another element of open posture is having the palms of the hands exposed.

Closed posture causes the interpretation of reservedness and distance. Crossed arms appear defensive, hands on hips can be considered domineering, and legs crossed away from someone may indicate dislike or discomfort.

Figure 4.2.11: An exposed torso and open palms is usually interpreted as friendly, confident and accessible.

PROXIMITY AND PHYSICAL CONTACT

Appropriate levels of physical content and **proximity** are culture specific. Research has been conducted into preferred distances between people interacting, and results indicated distinct differences across ethnicities. Results indicated that Middle Eastern countries require more personal space than Asian cultures, while Russians and Argentinians are comfortable in closer proximity to strangers.

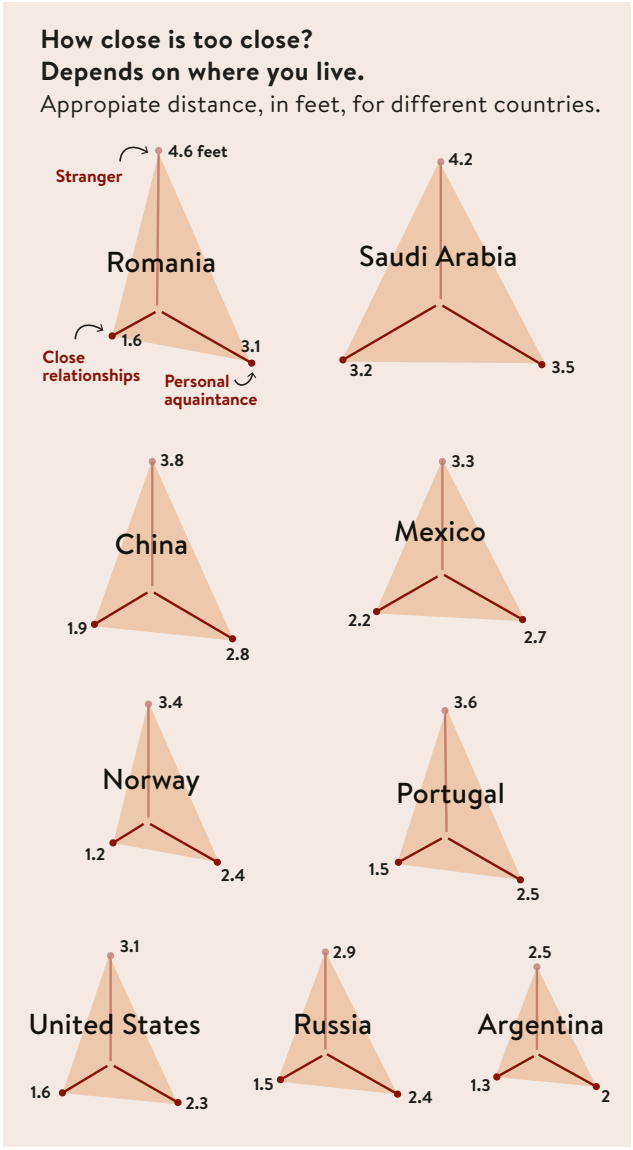


Figure 4.2.12: Appropriate distances for physical proximity in different countries.

HEAD MOVEMENT

Head movement is another method of gesture which can vary significantly between cultures. While Australians shake their head from side to side to communicate 'no' and nod it up and down for 'yes', these movements are not universal. In Indian culture, tilting the head from side to side is used to confirm understanding, or show the speaker he is being listened to. In Greece, moving the head first to the left and then to the right means 'yes', while tilting the head upwards and backwards means 'no'.

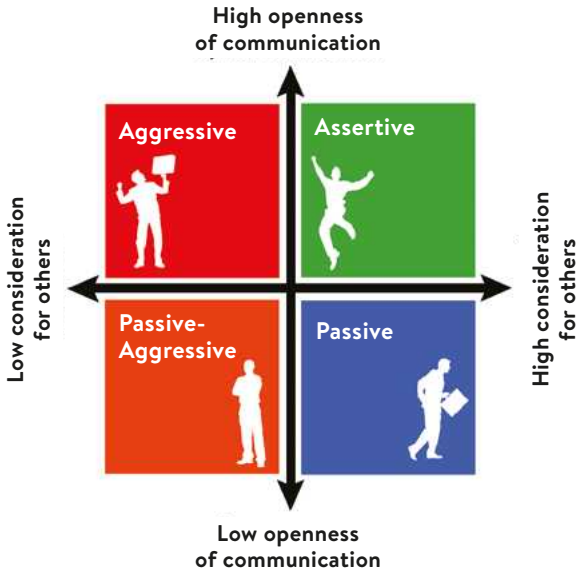


Figure 4.2.13: Assertiveness considers others while communicating openly.

Psychological interventions

ANGER MANAGEMENT

Anger is a powerful emotion. As represented by Plutchik's colour wheel, it can begin as a minor annoyance, and progress to rage. While anger is a natural and healthy emotion, it can be difficult to manage and, when uncontrolled, wreak havoc on one's relationships, personal life and mental health.

Some people experience the emotion of anger more frequently and with a greater intensity than most. Some are highly expressive in their anger, while others are regularly irritable and grumpy. These individuals commonly have a low tolerance for frustration, meaning that the experience of annoyance progresses to rage far more often that it should (see Plutchik's colour wheel).

As with all basic emotions, anger causes a physiological response, accompanied by a subjective feeling and expressive behaviour. Experiencing strong feelings of anger can cause an increase in heart rate and blood pressure, as well as the secretion of hormones including adrenaline.

The expressive behaviour that accompanies the subjective feeling of anger is usually aggressive. The emotion of anger is often caused by the perception of threat, therefore a defensive response is required for survival. However, we are no longer cavemen for whom perceived threats are a literal matter of life or death! It is neither appropriate nor acceptable to lash out in anger towards any person who upsets or annoys us. Additionally, the subjective feeling of anger can, in some people, be triggered too easily and frequently, causing them to respond with disproportionate aggression. Aggressive

behaviour can harm relationships, is rarely socially acceptable and can jeopardise success in the workplace.

What triggers the emotion of anger varies significantly between individuals. Triggers can be external (such as a person, an event or a situation) or internal (negative or irrational thinking processes or memories). Responses to anger can also be considered in this way – aggressive behaviours are harmful to others, but aggressive thinking patterns and the long-term physiological changes associated with anger can be damaging to the individual.

Anger management can refer to a series of self-management strategies used to control the intensity of the subjective feelings associated with anger, as well as how the response to this emotion is expressed. Anger management can also be a form of therapy, where an individual utilises the skill and advice of a mental health professional to assist them in better understanding and controlling their anger and aggression.

Anger management as a therapy utilises three core processes to deal with angry feelings: **expressing**, **suppressing**, and **calming**.

Expressing refers to the way in which the emotion of anger is expressed. As mentioned previously, anger is often expressed aggressively. Anger management therapy teaches the patient how to express their emotions assertively. Assertive communication refers to expressing one's emotions in a direct and respectful way, without blaming another individual. It allows an individual to clearly articulate how they are feeling in a dignified way, maintaining positive regard between the two parties.

Suppressing refers to the purposeful control over expressive behaviours so that they are held inside and not exhibited without consideration of the impact. Suppressing can also refer to the purposeful change in focus – from thoughts of anger and aggression to thoughts that are calmer and more positive. This causes expressive behaviours to be constructive, rather than destructive. However, the strategy of suppression should be used with care – expression of emotion is an essential element of the way emotions are processed, and suppressing this aspect can cause the emotion to turn inwards and possibly manifest and intensify over time. Unexpressed anger can lead to poor physical health, including hypertension, high blood pressure and stomach ulcers, and also poor mental health, such as depression.

When anger is not expressed in an assertive manner, and purposely suppressed, it may be communicated through passive-aggressive behaviour, an indirect expression of anger which is hostile and manipulative.

PASSIVE-AGGRESSIVE BEHAVIOUR		
Passive	**Passive-Aggressive**	**Aggressive**
• You accept other peoples' criticisms of you • You avoid conflict no matter what • You rarely contest others	• You don't share your honest view when asked • You refuse to notify people of your dissatisfaction with them • You take part in gossip but not confrontation	• You put down others in front of people • You are fuelled by anger • You are known to have a 'short fuse'

Figure 4.2.14: Passive Aggression harms relationships as it is indirect, hostile and dishonest.

Calming refers to the process of attempting to relax and control one's internal responses. This could be done by deep breathing, meditation or waiting for the feelings to subside. These practices work to calm both the physiological responses and the subjective feelings associated with anger.

Figure 4.2.15: A Biopsychosocial approach is effective when considering the triggers of anger and how to manage expressive behaviours.

HELPFUL ONLINE RESOURCES

How can anger be managed? Watch this TED Talk presented by Nicole Blackwell.
https://tinyurl.com/5a32kskm

CHECKING FOR UNDERSTANDING

1. For each of the statements below, select TRUE or FALSE.

	TRUE	FALSE
Expressive behaviours are identical between cultures.		
Social Display Rules determine appropriate gestures and body language.		
The Limbic System processes emotions.		
Eckman considered Love a universal emotion.		
Eye contact display rules differ between cultures.		
We are more successful in recognising facial expressions in people of our own culture.		
The most effective communication type is aggressive.		
Anger is a natural and healthy emotion.		

2. Provide three examples of cultural differences in the way emotions are expressed.

SCIENCE INQUIRY SKILLS

A 2020 study conducted by Bente et al. investigated whether rapport (a connection between two people) can be correctly assessed based on viewing non-verbal interaction.

1. Suggest how the images shown below could be used in this study.

2. The investigators considered whether males and females interpreted the rapport between the models differently. Is this investigation an experiment or an observation? Explain your answer.

3. Suggest two extraneous variables that could limit the validity of this study.

4.3 EMOTIONS IN EVERYDAY EXPERIENCES

- **Psychological principles concerning emotion are evident in everyday experiences and events.**

2023 Subject Outline | Stage 1

As discussed previously in this chapter, emotion is defined as having three components: a physiological response, a subjective feeling and an expressive behaviour. There are many everyday events and experiences in which these elements of emotion are evident.

EXAMPLE 1: EXPRESSIONS OF ANGER

Imagine a driver being tailgated by another car. Every time she glances in her rear-view mirror, the vehicle behind seems to get closer and closer. A glance at the speedometer confirms she is doing the speed limit, and is driving in the left lane – so why can't the driver behind just overtake, or drop back a little? Eventually the car behind increases speed and overtakes, with the driver shaking his fist out of the car window. His face is red, and his forehead is wrinkled. He yells "hurry up!" as he glares and the car drives past – only to end up at the red traffic light ahead.

Figure 4.3.1: The psychological principles of emotion can be explained through the example of road rage.

The man in the tailgating car was clearly frustrated and angry, causing a number of physiological changes to take place. His red face is due to an increase in blood flow, designed to ready the body for action. The driver's heart rate would have increased, his blood pressure would rise, and his breathing would be fast and shallow. Perspiration may also appear on his skin, and clenched facial muscles would have caused his forehead to contract.

The emotion of anger was triggered in the driver, likely stemming from the experience of frustration. Yet not all drivers feel such an intense level of anger while traveling on the road. The cause of this display of rage is subjective to the individual. Perhaps the driver believed that the woman driving in front of him was deliberately slowing him down. Maybe the driver was stressed and in a hurry to reach his destination. He may have had a difficult day at work and his anger is displaced towards other motorists.

The driver's personal characteristics also contribute to his subjective feelings. Some people experience higher levels of aggression than others or become frustrated more easily. Perhaps the driver lacks the ability to calm himself appropriately, causing his anger to intensify. Biologically, there may be neurotransmitters, hormones or anatomical differences that contribute to his emotional state. It is also possible that his past experiences on the road have caused an over-reaction. This combination of individual differences cause the subjective feelings associated with the emotion.

Finally, the man engaged in expressive behaviour, which, in the country and the context of the road rage incident, represented his feelings of anger and frustration. The aggressive driving, the fist shaking and the yelling at the other motorist are all behaviours that are interpreted as hostile and antisocial. The eye contact with the other driver is another indicator of his desire to intimidate.

EXAMPLE 2: EXPRESSIONS OF FEAR

The recipient of the aggressive behaviour – the female driver of the car being tailgated – would also experience emotion in the scenario above. It is likely that she would feel apprehensive or scared in response to the man yelling and shaking his fist. Her fear can also be explained using the three components of emotion.

Physiological changes would occur due to the fight or flight response – the body's automatic response to threat. Cortisol and adrenaline would have been released into the blood stream, causing an increase in blood flow, breathing rate, blood pressure and heart rate. The pupils dilate, the liver metabolises glucose and skin may become flushed in some places and pale in others as the direction of blood flow changes.

The emotion of fear was triggered by the aggression shown by the tailgating driver. However, not all drivers would respond with fear to the same situation. The experience

of fear is subjective and caused by a number of personal characteristics. The female driver may have believed that the other motorist was going to physically hurt her. Perhaps she was shocked by way he overtook, or the anger with which he yelled at her. Maybe this is the first time she has experienced road rage and was taken aback that someone could be so aggressive while driving. It is possible that she is more sensitive to anger than most people or has a personality that causes her to respond to threat with fear, rather than mirror his rage and retaliate in kind.

The way the female driver responds to the aggressive motorist is an example of expressive behaviour. Perhaps, in her shock, she pulls the car over and begins to cry. Her mouth may drop open, and her eyes widen in the expression of fear. She may even respond to his fist shaking with a rude gesture of her own. Purposely avoiding eye contact with the other driver is also an expressive behaviour.

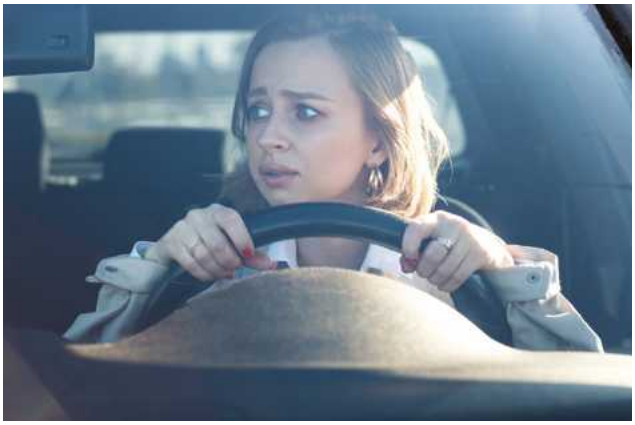


Figure 4.3.2: The psychological principles of emotion can be explained through the example of experiencing fear in response to aggression.

USING TECHNOLOGY TO REGULATE EMOTION

There is no doubt that our technology consumption has significantly increased over the last decade. More and more aspects of our lives are going digital – our education, our weekly shop, our entertainment and our social lives. It is difficult to get through a single day without picking up a smartphone or logging into a laptop. However, technology can also be a time-consuming source of distraction. I am sure you can think of a time (maybe even as recently as today!) where you have allowed the many applications and features of technology to distract you, taking up the time you could have spent on more 'beneficial' pursuits.

While overuse of technology is undoubtedly an issue, with many negative consequences, researchers from the University of Melbourne, together with partners from Stanford University and the University of London have investigated whether the time spent on devices is not 'unproductive', but rather, an important method of emotional regulation.

Emotional regulation is defined as one's ability to effectively manage and respond to an emotional experience. Humans experience myriad of emotions each day, and most will engage in unconscious thinking or behaviours to control them. There are many healthy strategies which can be used to control emotions – such as deep breathing, going for a walk, practising mindfulness, exercising or discussing one's feelings with a confidante. Until recently, the use of technology was not considered a method of emotional regulation.

Figure 4.3.3: Could technology such as phones and computers be a healthy way to regulate emotion?

Digital emotional regulation has emerged as an important area of psychological research, as technology is being used not only to assist in the way emotions are managed, but also as a potential source of the emotion itself. The many applications and programs available to users of technology allow individuals to tailor an online method of emotional regulation best suited to them and their personal preferences.

One such example is use of the app Spotify, which allows the user to create curated playlists of their favourite music. The portable nature of the smartphone, combined with the personalised track selection means that listening to music could be used as an emotional regulation tool. Listening to music has been found to be as effective as medication in changing brain function – in fact, current findings indicate that listening to calming music causes the frequency of brainwave transmission to decrease, causing feelings of drowsiness if listened to for long enough. Conversely, listening to upbeat music can cause listeners to feel energetic and positive. Some people choose to listen to sounds of nature, such as water flowing, to reduce feelings of tension and stress. Regardless of the genre chosen, advancements in technology have allowed consumers to access their music at any time, and therefore use it to assist in the regulation of their emotions.

Figure 4.3.4: Online music platforms such as Spotify allow people to access music that can assist in emotional regulation.

Similarly, popularity of video-sharing websites such as YouTube allow users access to millions of short videos, which are often a source of distraction and entertainment for viewers. Amongst the footage of hilarious pets and true crime stories, there are also thousands of meditation and mindfulness videos which can be used to reduce stress and increase focus.

HELPFUL ONLINE RESOURCES

Try this 10-minute guided meditation!
https://tinyurl.com/4jsp4bdu

In fact, there are many applications that can be downloaded for the sole purpose of emotional regulation, with options for all ages. For children, these apps assist with identification of feelings, navigating social difficulties, solving problems and regulating emotion through breathing exercises. For adults, there are apps that guide one through elements of therapy, provide relaxation training, encourage mindfulness and track mood. There are even apps that feature story telling, narrated in a deep, soothing voice, which are commonly used to assist with falling asleep at night.

Research has found that many individuals use video gaming as a method to reduce stress or to escape from the realities of life for a short while. In fact, it has been determined that gaming can be used to increase positive emotions, manage stress, and boost creativity.

Studies have also determined that action shooting games are the most highly correlated with stress recovery, and that male gamers who engage in social gaming with other people experience bonding with and social support from the players they communicate with.

A study conducted by Kejia Shen in 2020 researched how video games can be used as a tool for digital emotion regulation. Participants were required to keep a diary detailing their daily use of video games and how they chose to use these games as a method to regulate emotions. The results revealed that many participants chose to play video games when they were experiencing negative emotions, such as boredom, stress, frustration, or sadness. Escapism was another common theme, with many gamers stating that they often used gameplay to temporarily 'escape' from the troubles of daily life.

Participants generally agreed that their emotional state improved after playing video games – another example of using digital devices to regulate emotion. Gaming was described by participants as 'calming', 'therapeutic' and 'settling'. Some players even believed that gaming enhanced focus and motivation (Shen, 2020).

Figure 4.3.5: Studies have shown that consumers often use video games to relieve negative emotions, settle their mood and allow for temporary escapism.

Virtual Reality refers to computer-generated simulations of three-dimensional images and interactive environments. Recent research has confirmed its value as another technology which can be used to improve self-regulation of emotions.

Virtual Reality (VR) can be used to assist with the practice of mindfulness. Mindfulness is a therapeutic technique where one achieves a calm mental state through focussing on the present moment. Those who practise mindfulness can find that environmental distractions are challenging in the attempt to experience the necessary quiet focus. Studies have suggested that this is one of the potential benefits of VR – providing a tailored environment free from distraction, to enhance the experience of mindful meditation. In a study entitled 'Understanding how Virtual Reality can support Mindfulness Practice', participants reported feelings of relaxation, calm and peace after engaging in VR-guided mindfulness. (Seabrook, 2020).

Figure 4.3.6: Virtual Reality can be used to create a tailored environment conducive to mindfulness.

Research has also been conducted into the use of VR as part of a therapeutic program to treat anxiety disorders, including phobias and Post Traumatic Stress Disorder (PTSD). One study conducted by the NeuroMeditation Institute in the United States required participants to self-report on their symptoms of anxiety after participating in a nature-based mindfulness VR experience. Their brainwaves were also monitored on an electroencephalogram (EEG), which revealed more alpha waves associated with feelings of deep calm and relaxation, consistent with a physiological reduction in anxiety. This suggests that VR could be used as an intervention for Generalised Anxiety Disorder.

Virtual Reality Exposure Therapy (VRET) has been used to assist sufferers of both PTSD and specific phobias. It is known that one of the most effective strategies for the reduction in symptoms of these disorders is for the sufferer to confront the source in a gradual and controlled manner. Depending on the exact trigger for the anxiety, this could be quite difficult, or even dangerous. For example, the veteran returning from war with PTSD may not have the ability to access triggers such as jungles, helicopters or large groups of soldiers in military uniform.

However, research on Vietnam veterans with PTSD has shown that using VRET to create virtual environments has contributed to the reduction of symptoms in sufferers. Most notably, the tailored and controlled scenes created in virtual reality have allowed veterans to confront the triggers of their anxiety in a safe manner, leading to a reduction in avoidance behaviours in everyday life.

VRET has also been utilised in sufferers of specific phobias such as arachnophobia (fear of spiders) and agoraphobia (fear of unfamiliar environments). (Krzystanek et al., 2021). It has been found to be effective when performed in 8-12 sessions at least once per week.

HELPFUL ONLINE RESOURCES

Listen to this TED talk about how VR can be used to support mental health.
https://tinyurl.com/wcpdj87y

CHECKING FOR UNDERSTANDING

Provide your own example of how technology can be used to regulate emotions.

Social Networking and Emotion

A social network refers to a website or application dedicated to the connection of users with other individuals or groups. Users communicate through online chat, forum discussion, and by sharing updates, images and information about one's life. The myriad of social networks available online are collectively referred to as **Social Media**.

Figure 4.3.7: Some of the most popular social media apps include Facebook, Instagram, and Snapchat.

POSITIVE INFLUENCES

Feeling connected to others and enjoying companionship has a significant influence on mental health and wellbeing. Having a social support network, either face-to-face or in an online environment, has been found to ease stress, increase feelings of self-worth and reduce the likelihood of one suffering from depression or anxiety. Maintaining these connections online was particularly beneficial during the Covid-19 pandemic, where much of our usual social activities were restricted. Additionally, social media allows individuals to connect with friends and family who they are otherwise separated from geographically.

Figure 4.3.8: Social media aids connection with others.

Many social media users find it easier to communicate their authentic emotions online, compared to face-to-face situations. In fact, there are over 17 billion views on Tik Tok with the hashtag #mentalhealth, suggesting that mental illness is discussed more openly online than it is elsewhere. This could be due to the anonymity afforded to users when interacting on social media platforms. It allows for self-expression with a reduced chance of stigma.

According to the National Centre for Biotechnology Information (NCBI), self-disclosure can be an important therapeutic ingredient and is linked to improved physical and psychological well-being. Individuals may choose to withhold their actual identities, allowing themselves to engage in more candid self-disclosure than is possible in offline settings (Naruse, 2023).

Social media can also provide an outlet for creativity and self-expression. Groups and forums allow individuals to easily connect with like-minded peers, who share the same interests, hobbies or opinions. While users sometimes face the conflict of choosing whether to present their authentic self or an idealised version online, research has found that authenticity is linked to higher levels of positive emotion and life satisfaction. (Bailey et al., 2020).

NEGATIVE INFLUENCES

It is important to recognise that there are elements of social media which also have the potential to evoke negative emotions in users. Usually, these result from a reliance on social media, overuse of technology or the lack of a balance between online interactions and those enjoyed in real life.

CHECKING FOR UNDERSTANDING

Brainstorm ways that social media can be used as an outlet for creativity and self-expression.

Use of the photo-sharing platform Instagram has been linked to a decline in mental health in some adolescents. The American Psychological Association (APA) has stated "Studies have linked Instagram to depression, body image concerns, self-esteem issues, social anxiety, and other problems. By design, the app capitalizes on users' biological drive for social belonging—and nudges them to keep on scrolling." (Abrams, 2021).

Apps such as Instagram intensify social comparisons. When constant comparisons are made to individuals perceived to 'have more' or 'be more', a poor self-esteem and an increase in negative emotions such as self-doubt and depression can result. The APA also warn "users evaluate their own life alongside curated – and often edited – images of others... that can lead to false social comparison when users curate their appearance with idealised images." (Abrams, 2021).

Figure 4.3.9: Apps such as Instagram intensify social comparisons.

HELPFUL ONLINE RESOURCES

Former Facebook employee Tim Kendall speaks about the impact of social media on mental health.
https://tinyurl.com/re8t6hrv

The Fear of Missing Out (FOMO) is another concern surrounding overuse of social media. FOMO is a form of anxiety fuelled by upwards comparisons between oneself and other social media users. For example, viewing someone's photo reel may lead to the belief that their life is 'perfect' – and that they are considerably more successful, attractive and content than you! FOMO can compel users to check their phone or social media accounts obsessively, to ensure that they are constantly up to date with new content, and they do not miss the opportunity to respond to new conversations or events. This can lead to distractions while learning, a lack of sleep, and prioritising online relationships over those experienced in real life.

Figure 4.3.10: The contrast between FOMO and JOMO: While some feel fear when disconnected from social media, some feel joy.

Cyberbullying refers to the use of electronic communication to bully a person. This can occur through email, instant messaging or adding derogatory and hurtful comments to a user's posts or photos.

A 2020 study published in the Journal of Interpersonal Violence found that cyberbullying victimization was associated with greater levels of anxiety and depression symptoms in teenagers (Brochado, 2017).

Figure 4.3.11: Cyberbullying causes negative emotions online.

SCIENCE INQUIRY SKILLS

In 2018, a study was conducted by the University of Pennsylvania that suggested that excessive use of social media increased feelings of loneliness and depression.

143 undergraduates were randomly assigned to either limit Facebook, Instagram and Snapchat use to 10 minutes, per platform, per day, or to use social media as usual for three weeks.

The limited use group showed significant reductions in loneliness and depression over three weeks compared to the control group. Both groups showed significant decreases in anxiety and fear of missing out over baseline, suggesting a benefit of increased self-monitoring.

1. Explain why this study is experimental.

2. What were the conditions of the control group?

3. Suggest one way in which the qualitative, subjective data could have been obtained in this study.

4.4 EMOTIONAL DISORDERS

- Emotional disorders occur when individuals have difficulty regulating their emotions and it becomes a problem that is a danger to themselves or other people.

2023 Subject Outline | Stage 1

Emotional disorders are a group of mental health conditions that affect a person's mood, behaviour, and emotional state. These disorders are characterized by intense and persistent feelings of sadness, anxiety, fear, anger, or other negative emotions that significantly impair a person's ability to function in their daily life.

Emotional disorders can become threatening to the health and safety of an individual in the following ways:

Impact on physical health: Emotional disorders such as depression, anxiety, and stress can have a negative impact on physical health, leading to various health problems such as heart disease, high blood pressure, and weakened immune system.

Impaired daily function: Emotional disorders can interfere with a person's ability to function in their daily life, including work, school, and social interactions. This can lead to isolation and reduced quality of life.

Relationship problems: Emotional disorders can lead to problems in relationships, including difficulty expressing emotions, low self-esteem, and conflicts with loved ones.

Severe, prolonged or untreated emotional disorders may also lead to thoughts of self-harm and suicide.

Figure 4.4.1: Emotional disorders threaten the health and safety of the individual.

Anxiety Disorders

Anxiety disorders are a group of conditions that involve excessive worry, fear, and apprehension. Common anxiety disorders include generalized anxiety disorder, panic disorder, phobias, obsessive compulsive disorder and social anxiety disorder.

OBSESSIVE COMPULSIVE DISORDER

Obsessive Compulsive Disorder (OCD) is a form of anxiety disorder characterized by unwanted, anxious thoughts (**obsessions**) and accompanying repetitive actions (**compulsions**). These thoughts and behaviours are difficult to control and impact a sufferer's ability to live a normal life.

There is no single cause of obsessive-compulsive disorder. It is likely to be a complex interplay of genetic, neurological, and environmental factors.

Researchers have identified anatomical differences in some sufferers of OCD, namely in the areas of the brain involved in regulating emotions: the basal ganglia, orbitofrontal cortex, and anterior cingulate cortex (Maia et al., 2008).

Some studies suggest that OCD may be linked to imbalances in brain chemicals called neurotransmitters, particularly serotonin, which is involved in regulating mood, anxiety, and stress.

HELPFUL ONLINE RESOURCES

Watch this video about a teenage girl coping with severe OCD and how it impacts her life.
https://tinyurl.com/4c3yz2de

It has also been suggested that environmental factors can contribute to the development of OCD. A study conducted by the European Journal of Psychotraumatology concluded that childhood maltreatment is highly prevalent amongst sufferers of OCD, implying a correlation between early life stress, abuse and trauma and suffering from the anxiety disorder (Boger et al., 2020).

A research paper submitted to the Psychiatric Clinics of North America explained that, while there was evidence for OCD having a genetic basis, other environmental influences were also involved. Studies have suggested a 7-15% increase in the likelihood of developing OCD if a first-degree relative also suffers. Twin studies have suggested that there is up to 70% concordance for monozygotic (identical) twins, and approximately 30% for dizygotic (non-identical) twins (Nestadt et al., 2010).

Figure 4.4.2: The likelihood of developing OCD is higher when an individual has a twin who also suffers.

Symptoms of OCD include patterns of unwanted thoughts that cause the sufferer to engage in repetitive behaviours. The combination of obsessions and compulsions is so time-consuming and tiring that it causes significant distress and interferes with a sufferer's ability to lead a normal life.

Many sufferers try to control their obsessions by ignoring them, but this only causes feelings of stress and anxiety to build, eventually forcing them to perform the compulsion to reduce these negative emotions.

The obsessions experienced by sufferers of OCD usually have themes. Some examples are:

- Needing to have things orderly and symmetrical.
- Fear of dirt and germs.
- Fear of not being able to control violence towards oneself or others.

OCD sufferers who are triggered by order and symmetry experience intense distress when they are unable to maintain items in this way. It may lead to the compulsions of continual checking to ensure order is maintained or taking vast amounts of time to organize the household or workspace, even when it is already neat and orderly. This can also extend to further behaviours such as obsessively inspecting doors and windows to make sure they are closed and locked or checking that electrical appliances and power points are off. While most of us would check this once and be satisfied, sufferers of OCD often need to check multiple times, with their obsessions causing them to question if it was done properly the first time.

Figure 4.4.3: A common obsession in OCD is for cupboards to be so orderly that all items face the same way.

Some sufferers of OCD have an overwhelming obsession with cleanliness and hygiene. This can lead to behaviours such as showering multiple times per day or spending hours cleaning the house. A common symptom in sufferers of hygiene-related obsessions is raw skin on the hands due to washing them hundreds of times per day. The fear of dirt, germs or contamination may lead sufferers to fear leaving their home, or visiting places where the level of cleanliness cannot be controlled.

One of the most distressing types of obsessions is those related to self-harm, violence towards others and spiritual delusions. These repetitive thoughts cause intense anxiety as they centre around visual imagery of harm to oneself or others. These thinking patterns are a subset of OCD known as Harm OCD and lead to the sufferer being unable to trust their own mind. While many people experience aggressive or violent thoughts occasionally, most are able to choose not to act on them, and rationalize that it was 'only a thought'. Sufferers of OCD often interpret such thoughts as predictions of future behaviours, and will experience anxiety, causing them to perform compulsive behaviours in an attempt to eliminate the fear. This could also include compulsive prayer, that they will not engage in violent behaviour and harm others.

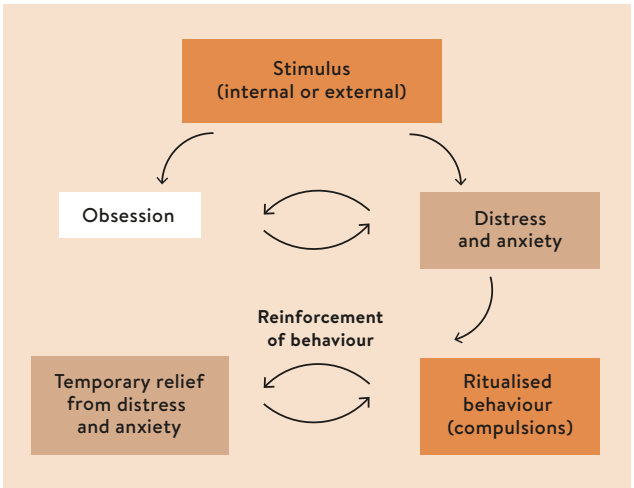


Figure 4.4.4: Symptoms of OCD are often a vicious cycle.

It is important to recognise that the symptoms and severity of OCD differ significantly between sufferers. Some patients may have a mild case and are usually able to overcome the obsessive thoughts without engaging in compulsive behaviours. However, others may experience such intense obsessions that their compulsions are taking up almost every waking hour, in an attempt to keep their anxiety under control.

One of the most common treatments for OCD is **Cognitive Behavioural Therapy** (CBT). CBT is a type of talking therapy which focuses on adjusting thinking patterns and therefore altering maladaptive behaviours.

CBT is one of the most successful types of therapy due to its flexibility in catering to individuals and their unique experiences and concerns. In sufferers of OCD, CBT includes an element known as '**Exposure** and **Response Prevention**' (ERP).

ERP involves gradually exposing the patient to situations or stimuli that trigger their anxiety or obsessive thoughts, and then preventing them from engaging in compulsive behaviours or rituals in response. The exposure component of ERP is designed to help the patient confront and overcome their fears, while the response prevention component aims to break the cycle of anxiety and compulsive behaviours.

For example, a patient with OCD who has a fear of contamination might be exposed to a gradually increasing level of dirt or germs, while being prevented from engaging in their usual handwashing or cleaning rituals. Through repeated exposure and prevention of the compulsive behaviour, the patient's anxiety gradually decreases as they learn to tolerate and manage their fears.

Figure 4.4.5: ERP involves exposing patients to their obsessions without allowing them to participate in the compulsive behaviours.

Patients suffering from mild OCD usually require between 8-20 sessions of CBT to experience an improvement in their symptoms. During this time, they learn the strategies needed to better manage their obsessions, and they can continue to practice these techniques independently. However, sufferers of severe OCD may need a longer course of treatment.

Medication can also help sufferers of OCD and is often prescribed in conjunction with talking therapy such as CBT. The main medications used to treat OCD are **Selective Serotonin Reuptake Inhibitors** (SSRIs) which increase levels of serotonin in the brain. Serotonin is a neurotransmitter which also acts as a hormone. It is a mood stabilizer which controls wellbeing and happiness.

Figure 4.4.6: SSRIs such as Escitalopram can be used to treat sufferers of OCD, as well as a wide range of other anxiety and depressive disorders.

CHECKING FOR UNDERSTANDING

1. Summarise the ways that the emotions of a sufferer of Obsessive Compulsive Disorder differ to someone who does not experience the symptoms.

2. Explain why OCD is considered an anxiety disorder.

CHECKING FOR UNDERSTANDING

3. State three possible influences on the likelihood of someone suffering from OCD.

4. Consider the answers you provided in Question 3. Identify whether the causes are Biological, Psychological or Social.

5. For each of the statements below, select TRUE or FALSE.

	TRUE	FALSE
Every sufferer of OCD experiences the same symptoms.		
Compulsions refer to behaviours undertaken to calm anxious thoughts.		
There is no single cause of OCD.		

PHOBIAS

A **phobia** is a type of anxiety disorder characterised by a persistent and excessive fear of a situation, object, activity, animal or person. The fear is unrealistic and out of proportion to the potential harm of the trigger, causing the sufferer to experience intense feelings of dread or panic when placed in a situation with the object of their phobia.

Being confronted by the trigger can cause the sufferer to experience a **panic attack**, which is a brief episode of intense anxiety. This fight or flight response causes the body to respond to the perceived threat with the release of adrenaline, causing physical sensations such as increased heart rate, shortness of breath and uncontrollable shaking.

To avoid the feelings of terror and the physiological symptoms of panic, very often the sufferer will take great care to evade the object or situation triggering the phobia. This can lead to **avoidance behaviours** which may have a negative impact on one's life, such as restricting where they go, what they do, or the people they see.

Figure 4.4.7: Phobias can cause sufferers to experience a panic attack.

Many phobias begin in childhood; however, the symptoms and avoidance behaviours are commonly not recognised until late adolescence or adulthood (John Hopkins University, 2023).

As is the case with OCD, there are both genetic and environmental factors that contribute to an individual suffering from a phobia. Some can be traced back to a negative first encounter with the trigger of the fear, but this is not always the case.

Some studies have suggested that phobias run in families, and that phobic behaviours may be learned from observing other family members. For example, a small child may develop a fear of rats after watching his mother scream and run away when she sees one.

It has been determined that females are twice as likely as males to suffer from a phobia, but males are more likely to seek help to overcome them. Up to 16% of adolescents will experience a phobia in their lifetime. (Anxiety Canada, 2022).

HELPFUL ONLINE RESOURCES

Watch Jackie overcome her fear of birds in this program by the BBC.
https://tinyurl.com/2rwph49p

Phobias are commonly treated with a type of psychotherapy known as **Exposure Therapy**. Similar to that used to treat sufferers of OCD, Exposure Therapy focuses on teaching patients to change their response to the object or situation that they fear. The treatment features gradual and repeated exposure to the trigger in a safe environment. The patient utilises relaxation techniques such as deep breathing to control their anxiety as they are slowly introduced to the source of their phobia in successive increments.

For example, if you have a phobia of bees, you may begin by viewing a picture of a bee, before progressing to watching a video, holding a dead bee, visiting a hive and, eventually, holding a bee yourself.

Cognitive Behavioural Therapy can also be used to treat sufferers of phobias. In the same way as OCD, CBT can teach patients cognitive techniques which can be used to view and cope with the trigger of their phobia differently. CBT encourages sufferers to feel confident in the face of their fears, rather than allowing their fears to control them.

COGNITIVE BEHAVIOURAL THERAPY (CBT)

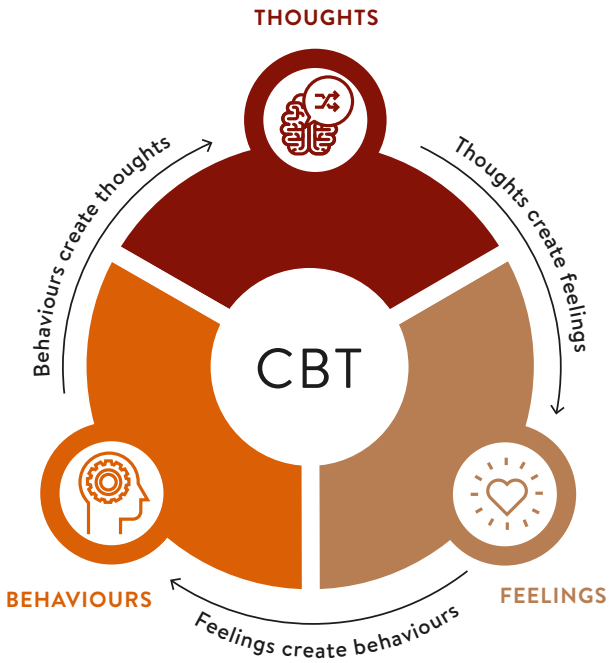


Figure 4.4.8: CBT can help restructure thinking processes which can lead to a reduction in avoidance behaviours.

HELPFUL ONLINE RESOURCES

Watch how Virtual Reality can be used to help a woman overcome her fear of heights.
https://tinyurl.com/4b4kzjws

Selective Serotonin Reuptake Inhibitors can also be used to treat phobias.

CHECKING FOR UNDERSTANDING

1. Nomophobia is one of the most recently identified phobias. What is it and what are the treatment options available?

2. Explain the difference between a simple fear, and a phobia.

CHECKING FOR UNDERSTANDING

3. Discuss how a phobia could be a learned response to a trigger.

4. Summarise the ways that the emotions of a sufferer of a specific phobia differ to someone who does not experience the symptoms.

Depressive Disorders

DEPRESSION

Clinical **depression**, also known as Major Depressive Disorder (MDD), is a mental health condition characterized by persistent feelings of sadness, hopelessness, and a lack of interest or pleasure in activities that a person typically enjoys.

Common symptoms of depression include difficulties with sleep, fatigue or low energy, low levels of motivation, difficulty maintaining focus and, in some sufferers, thoughts of self-harm and suicide.

HELPFUL ONLINE RESOURCES

View this clip by the World Health Organisation called 'I had a black dog; his name was Depression'.
https://tinyurl.com/m2j2dh63

The Diagnostic and Statistical Manual of Mental Disorders (DSM) 5th Edition lists the following criteria for a clinical diagnosis of depression:

- Depressed Mood
- Loss of Interest /Pleasure
- Weight loss or gain
- Insomnia or hypersomnia
- Psychomotor agitation or retardation
- Fatigue
- Feeling worthless or guilty
- Decreased concentration
- Thoughts of death or suicide.

Hypersomnia refers to excessive sleepiness, while psychomotor symptoms refer to an increase in movement (agitation) or a reduction, to the point of lethargy and impaired function (retardation) (MDCalc, 2023).

As with the anxiety disorders discussed previously, depression is a complex mental health issue with a range of contributing factors and causes.

Advancements in technologies such as **Positron Emission Tomography** (PET) and **Magnetic Resonance Imaging** (MRI) scans have allowed researchers to better identify which regions of the brain are involved in the experience of emotion and may therefore be affected by depression. These regions include the structures comprising the limbic system: the amygdala, thalamus and hippocampus.

In a meta-analysis of studies examining the relationship between depression and the hippocampus, it was found that people with depression had a smaller hippocampus

volume compared to those without depression. It has also been determined that the more severe the depression, the smaller the hippocampus volume. Additionally, research has shown that people with depression had decreased activity in the hippocampus compared to those without depression. This decreased activity was found to be associated with cognitive impairments in memory and attention.

Figure 4.4.9: Research has shown that people with depression have decreased activity in the hippocampus.

There is ongoing research being conducted into the neurochemistry of depression, with scientists believing that a lack of the neurotransmitter serotonin is likely. Certainly, when treated with SSRIs, most patients suffering from depression experience an improvement in their mood.

In sufferers of severe depression, it is likely that other neurochemical pathways are also disrupted, such as those that control the secretion of dopamine and noradrenaline. The Black Dog Institute is currently conducting trials into the use of ketamine to treat depression, as it has been found to assist in reversing brain shrinkage. (Black Dog Institute, 2022).

Research has also shown that the risk of developing depression is also partly determined by genetics. **Twin studies** have demonstrated that depression can be inherited, with up to 30% of the predisposition for depression attributed to genetic factors.

This leads to the understanding that at least 70% of the factors contributing to a predisposition for depression can be attributed to one's environment and experiences. These factors include illness, personality type, stress, and aging.

Being ill can lower one's mood, especially if the complaint is chronic or painful. Illness can cause boredom, fear and an inability to interact socially, all of which can exacerbate feelings of depression. There are some physical health conditions that directly contribute to depression, including epilepsy, brain tumours, degenerative neurological disorders and some cancers. Current research is considering the potential link between a compromised immune system and depression. Aging disorders such as dementia and mini-strokes may also alter the neurotransmitter pathways in the brain, contributing to the onset of depression.

There are also personality traits which may increase the likelihood of developing depression. Individuals who have high levels of neuroticism and lack the ability to effectively control their negative emotions may experience depression at a higher rate than those who are calm and composed. People who are hypersensitive to the criticism of others and those who are self-critical may also be at a greater risk of suffering from depression.

Stress and trauma have been known to trigger symptoms in individuals already susceptible to depression. Significant or ongoing stress can be difficult to deal with, leading to feelings of hopelessness and poor wellbeing. Examples of such events include relationship breakdown, divorce, or losing one's job. Stress can also be experienced due to past trauma, such as childhood neglect or maltreatment.

Figure 4.4.10: Depression has many causes.

As with the aforementioned anxiety disorders, Selective Serotonin Reuptake Inhibitors are one type of effective medication used in the treatment of mild to moderate depression. However, if an individual does not respond to the use of SSRIs and their symptoms are severe, there are other types of medication available.

Tricyclic Antidepressants differ from SSRIs in that they are less selective, meaning that they have the potential to affect more systems of the body. Like SSRIs, tricyclic drugs also increase the levels of serotonin in the nervous system, but their most significant action is on noradrenaline levels. Higher levels of noradrenaline increases alertness, attention and arousal, as well as improving mood and memory.

While both SSRIs and tricyclics can cause side effects in the patient, the effects of tricyclics are more severe, and impact more areas of the body. They can include sleepiness, constipation, difficulty urinating and weight gain.

HELPFUL ONLINE RESOURCES

View this clip by the World Health Organisation called 'Living with a Black Dog'. https://tinyurl.com/mus3kxub

Cognitive Behaviour Therapy is also highly effective in treating sufferers of depression. Over time, patients are taught to identify the negative and irrational thinking patterns they experience, and practice actively challenging and changing them.

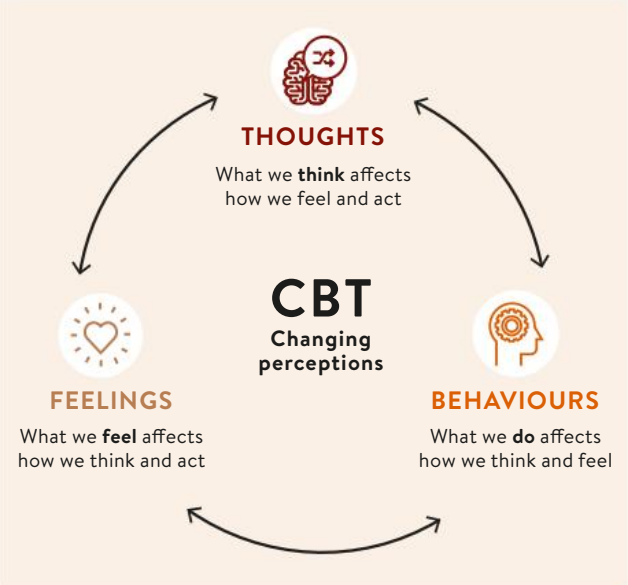


Figure 4.4.11: Cognitive Behaviour Therapy teaches sufferers of depression to identify, challenge and change their negative and irrational thinking patterns.

HELPFUL ONLINE RESOURCES

Moodgym is a website that offers free, online CBT, originally developed by Australian National University. https://moodgym.com.au/

Exercise has been found to be just as successful as SSRIs in reducing the symptoms of mild to moderate depression. Exercise causes the brain to release endorphins, which reduce feelings of pain, and trigger positive emotions, increasing feelings of wellbeing. Exercise also reduces the levels of cortisol and adrenaline in the body, which are caused by stress.

Exercise also has psychological and social benefits. Improving strength and stamina, or meeting fitness goals can encourage feelings of pride and accomplishment. Becoming fitter and stronger, or losing excess weight can lead to an improved self-esteem. Exercising with a partner or in a group increases social interaction, which is a known **protective factor** against depression.

Exercise is a healthy way to deal with stress and may reduce the chance of an individual adopting maladaptive coping strategies or engaging in rumination and negative thinking.

Figure 4.4.12: Exercise has been found to be highly effective in reducing the symptoms of mild to moderate depression.

BIPOLAR DISORDER

Bipolar disorder, also known as manic-depressive illness, is a mental health condition that affects a person's mood, energy, activity level, and ability to function in daily life. People with bipolar disorder experience episodes of extreme mood swings, shifting between periods of elevated or manic moods and periods of depressive or low moods.

During a **manic episode**, a person may feel extremely energetic, euphoric, or irritable, have racing thoughts, engage in impulsive behaviour, and have a decreased need for sleep. During a **depressive episode**, a person may feel sad, hopeless, fatigued, have trouble sleeping, lose interest in activities they once enjoyed, and have difficulty concentrating.

The exact cause of bipolar disorder is not fully understood, but it is likely to be the result of a combination of genetic, environmental, and neurological factors.

As with depression, the likelihood of suffering from bipolar disorder is increased when a close relative also suffers. If one parent suffers, the likelihood increases by 10%, rising to 40% if both parents have bipolar disorder. Bipolar disorder is frequently inherited, with genetic factors accounting for approximately 80% of the cause of the condition. (Black Dog Institute, 2023).

Traumatic and stressful life events can also trigger the onset of bipolar disorder. It is important for sufferers to develop effective stress management skills, to reduce the chance of relapse.

In some sufferers of bipolar disorder, the use of both illicit and prescription drugs can cause a manic episode. Antidepressants can trigger this response in some people, as can corticosteroids or high levels of caffeine. Illegal drugs such as cocaine, ecstasy and methamphetamines can also initiate mania. (Black Dog Institute, 2023).

Treatment for bipolar disorder is usually life-long and is a combination of medication and therapy. Medications include mood stabilisers and antipsychotic drugs, which are often immediately prescribed on diagnosis so that the patient's mood can be balanced as quickly as possible.

Therapy is also an important aspect of recovery and reducing the chance of relapse. Cognitive Behaviour Therapy may be effective; however, there are a range of other therapy types which work to encourage insight into the disorder and assist the patient in developing important routines that allow for better mood management. This is known as interpersonal and social rhythm therapy. (Mayo Clinic, 2022).

HELPFUL ONLINE RESOURCES

Listen to celebrity Selena Gomez discuss her ongoing battle with Bipolar Disorder.
https://tinyurl.com/yc6e5zk2

Figure 4.4.13: Sufferers of bipolar disorder experience both heightened and depressed emotions.

CHECKING FOR UNDERSTANDING

1. Explain how Cognitive Behaviour Therapy can be used to treat depression.

2. List three factors that contribute to the likelihood of developing depression.

3. Summarise the ways that the emotions of a sufferer of a specific Bipolar Disorder differ to someone who does not experience the symptoms.

Mood Disorders

Whilst anxiety and depressive disorders tend to impact mood relatively consistently across sufferers, mood disorders such as **Oppositional Defiance Disorder** (ODD) and **Autism Spectrum Disorder** (ASD) can be expressed differently between individuals.

OPPOSITIONAL DEFIANCE DISORDER

Oppositional Defiance Disorder is a mood disorder commonly diagnosed in children and teenagers. It is characterised by intense anger, often demonstrated as aggression and hostility towards parents and other adults in authority.

Children with ODD find it difficult to control their negative emotions, often displaying antisocial behaviours such as temper tantrums and forceful arguments. In some children, these behaviours are only directed at parents, at home. However, other children also demonstrate hostility and defiance towards other adults in other settings, such as school.

Indicators of ODD in children include:

- Inability or refusal to obey rules
- Deliberately antagonising others
- Being vindictive and spiteful
- Seeking revenge
- Inability to control temper
- Speaking harshly or unkindly
- Excessive arguing
- Blaming others for their own poor behaviour (Holland, 2019).

Many children diagnosed with ODD also experience low self-esteem and persistent negative emotions. These symptoms interfere with the ability to lead a social, productive life, and develop healthy relationships.

HELPFUL ONLINE RESOURCES

Watch this video for further explanation of the symptoms of ODD in children.
https://tinyurl.com/zye5za2a

There is no clear cause of ODD. Johns Hopkins Medicine suggests that a series of factors may contribute, including:

- Unsuccessful or delayed progression through key developmental stages.
- Learned, attention-seeking behaviour.
- A permissive parenting style.
- Stress or trauma in personal life.
- (Johns Hopkins Medicine, 2021)

Boys are more frequently diagnosed with ODD than girls. Additionally, children who also suffer from anxiety or conduct disorders, or Attention Deficit Hyperactivity Disorder (ADHD) are more likely to suffer from ODD.

Medication is not often used in the treatment of ODD, mainly because of the age of the children who suffer. Therapy is the most common option, with CBT being complimented by **Family Therapy** to improve communication and interactions within the home. As parenting a child with ODD can be very challenging, providing care givers with support, advice and encouragement is also essential.

If children with ODD are not provided with effective therapy, strategies and support during their early years, there is a higher chance that they will develop a conduct disorder, or Antisocial Personality disorder. Teenagers who demonstrate hostility, defiance and anger will experience problems with authority, frequent conflict in relationships and the inability to show empathy or forgiveness.

Figure 4.4.14: Untreated ODD in young children may progress to a conduct disorder in adolescents.

AUTISM SPECTRUM DISORDER

Autism Spectrum Disorder (ASD) is a neurodevelopmental disorder that affects communication, social interaction, and behaviour. It is called a 'spectrum' disorder because it affects individuals in varying degrees and in different ways.

Some common characteristics of ASD include difficulties in social interaction, communication, and repetitive behaviours or interests. People with ASD may also experience sensory sensitivities or challenges in processing sensory information.

Unfortunately, individuals with ASD often suffer from comorbid anxiety and depression at higher rates that the general population. It has been suggested that this is due to heightened levels of stress or sensitivity in social situations.

Alexithymia is a common symptom of ASD. It refers to difficulty in recognising and describing one's own emotions. It has been linked to depression and suicide.

Alexithymia is also characterised by an inability to effectively identify and understand the emotions of others, which causes problems in developing and maintaining close social relationships.

Mood and emotional reactions are often unusual in sufferers of ASD. Because patients find it difficult to interpret their emotions, accompanying behaviours may seem extreme, mismatched or peculiar. Some ASD individuals experience emotions more intensely, with many sufferers becoming angry quickly and having difficulties in controlling their emotions.

Some sufferers of ASD experience '**melt downs**', an intense response to an overwhelming situation. Meltdowns occur when an individual with ASD feels completely overcome with emotion in a difficult situation, and temporarily loses control of their behaviour. This lack of control is often displayed by extreme emotional responses such as shouting, screaming and crying. Physical responses such as lashing out can also occur.

Meltdowns are not the only way sufferers of ASD express feeling overwhelmed. They may also withdraw from situations they find challenging, and purposely remove themselves from social environments. (National Autistic Society, 2023)

Because anxiety is often a **comorbid** disorder for individuals with ASD, situations that cause uncertainty or confusion can cause anxiety. This is why sensory differences or changes in routine can cause meltdowns to occur.

HELPFUL ONLINE RESOURCES

Alfred & Shadow - A short story about emotions.
https://tinyurl.com/yeszf8ny

Treatment plans for ASD differ according to the individual needs of the patient. Strategies are usually focussed around reducing symptoms of ASD that negatively impact the sufferer's ability to lead a calm and successful life.

One of the most frequently used types of therapy is **Applied Behaviour Analysis** (ABA), which teaches ASD sufferers to identify desired behaviours in different scenarios. While the learning begins in a clinical setting, as the individual develops their use of positive behaviours and social skills, their training is moved to situations outside of the clinic. Here, they practise communication with others, language skills and appropriate displays of emotion.

Occupational therapy is also used to teach ASD individuals to live as independently as possible. Therapists assist patients in learning how to dress, eat, bathe and relate to others, as well as practise the use of physical skills that require fine motor control.

While Cognitive Behavioural Therapy is occasionally used in ASD, it is not a widely utilised technique for sufferers.

Indigenous Mental Health Support

There are a number of challenges that Indigenous communities face when it comes to mental health. Mental health issues are often stigmatized in Indigenous communities, making it difficult for individuals to seek help or for families to openly discuss their experiences with mental illness.

Aboriginal people suffer significant disadvantage on all major measures of socio-economic wellbeing, including experiencing greater poverty, higher rates of unemployment, lower levels of education and over-representation in the prison system.

Additionally, Indigenous communities have experienced significant historical trauma, including the trauma of colonization, forced assimilation, and the residential school system. This trauma can have intergenerational impacts on mental health and wellbeing, with up to 20% of Aboriginal children suffering from diagnosable mental health issues. It is suggested that some of these disorders may be experienced in response to racism, oppression and disadvantage.

Studies have revealed that many Aboriginal communities in rural Australia lack access to the services required to effectively support Indigenous suffers of depression and suicidal ideation. Much of the support and therapy options that are available are based upon Western medicine and education and doesn't always take into account the intricacies of Indigenous culture and the deep connection First Nations Peoples have to land and kin. This can leave Indigenous people without culturally appropriate mental health support, trained mental health professionals and community support programs.

It is essential that doctors and mental health staff working in Indigenous communities are educated about Aboriginal history, communities and beliefs and work with their patients to address mental health holistically. Indigenous mental health is dependent on a range of unique factors including spirituality, connection to land, and the importance of ancestry and kin.

Due to the complexity of these factors, and the interconnection that impacts mental health in Aboriginal people, doctors must possess a deep, empathetic and insightful understanding. It is essential that not only are these influences acknowledged and understood, but it is also considered how they contribute to and enhance mental health.

Many Aboriginal people have reported that depression is not considered a treatable illness in Indigenous communities. This may mean that sufferers do not seek the help and support they need to improve their mental health and overcome their illness. In fact, some Indigenous communities consider mental health disorders to be caused by external forces, that may be attributed to wrongdoing by the sufferer.

Studies have found that, in many Indigenous communities, mental health issues in individuals are treated by Elders or bush doctors, who administer traditional methods based upon the cultural explanation provided for the illness. If these treatments are not successful, the sufferer may be referred to the Western health providers for further interventions.

It is therefore suggested that the most effective method of mental health care for Indigenous people should not only be implemented by professionals well educated in Indigenous culture and history, but should also incorporate both traditional and western approaches, provided by both Indigenous and non-indigenous people. This could increase the willingness of Aboriginal people to seek the support they need when suffering from mental health concerns, and hopefully improve the trust relationship between Indigenous people and westerners which was so brutally harmed during colonisation.

HELPFUL ONLINE RESOURCES

Learn more about Indigenous wellbeing.
https://tinyurl.com/s2wbput4

Dr Tracy Westerman is an Indigenous woman from the Njamal people of Western Australia. In 1998 she founded the private company Indigenous Psychological Services (IPS).

Driven by social justice, the service is self-funded and free for patients, to allow Aboriginal people to access specialised mental health care, which is culturally specific and sensitive.

Figure 4.4.15: Indigenous people may not seek mental health care due to cultural differences or stigma.

IPS delivers community-wide suicide prevention services to Indigenous groups in rural Australia, one of which resulted in over 300 people being identified as vulnerable to significant mental health issues and supported by the organisation. To date, over 2000 Indigenous communities have participated in these programs.

IPS also focusses on 'grass roots' training, where existing members of Indigenous communities are educated and upskilled in the delivery of mental health care to their peoples. This increases the level of trust between the patient and the care provider, as well as ensuring the delivery of the care is culturally relevant and appropriate.

IPS offers courses in Aboriginal Mental Health training, both in person and online, allowing non-Indigenous organisations to engage in the professional learning necessary to better understand the considerations and cultural sensitivity needed when delivering mental health care to Aboriginal Australians.

The training sessions have been developed for Aboriginal people by Aboriginal people, allowing participants to develop skills and understandings that have been scientifically proven to enhance mental health delivery in Indigenous communities.

In completing her PhD, Westerman undertook research into '**culture-bound**' syndromes in Aboriginal Australians. 'Culture-bound' refers to culturally specific patterns in troubling behaviour which may or may not correlate to criteria listed in the DSM 5. Indigenous people commonly recognise these behavioural differences as 'illnesses' or 'afflictions'.

Through the use of self-report data obtained via focus groups, Westerman was able to identify seven 'culture-bound' syndromes, some of which correlate to westernised mental health conditions. Three of them are discussed below.

'**Being Sung**': Also known as 'pointing the bone', this is an Aboriginal custom where an elder is believed to have the power to curse someone who has committed a wrongdoing. The belief that evil spirits have entered the body as form of punishment is all consuming, causing psychosomatic symptoms such as blindness, depression and sadness.

'**Longing for Country**': Aboriginal people have a strong relationship with their traditional lands which causes feelings of spiritual disconnection when they are removed from it. In addition to the ongoing sorrow caused by colonisation, even short absences from home country, caused by medical visits, or as punishment for wrongdoing, have been known to cause depression and suicidal ideation. Therefore, a deep spiritual link to land is essential for mental health.

'**Wrong Way Relationships**': In Aboriginal culture, individuals possess 'skin names', an element of the kinship system where Indigenous people receive a series of names based on their parents and connection to country. The skin assigned to an individual can also determine an appropriate marriage partner and can often mean that some marriages are culturally inappropriate. While historically, Australian Aboriginal people maintained a well-developed and careful consideration of skin names in choosing partners, the after-effects of colonisation, including the removal of children and breakdown of traditional communities has caused skin groups and avoidance relationships to become confused. This has meant that some Indigenous people have fallen in love with and married partners who they should have, traditionally, avoided, based on skin name. This can lead to shunning within the community and identity confusion within the individual. Mental health issues commonly arise, including depression and suicide ideation. (Westerman, 2021).

HELPFUL ONLINE RESOURCES

Click here to access the entire research paper.
https://tinyurl.com/5yhsvurn

The work of Tracy Westerman and Indigenous Psychological Services have been essential to the effective understanding and delivery of mental health services in Aboriginal communities, and the ongoing education of professionals in the sensitive and culturally appropriate ways to do so.

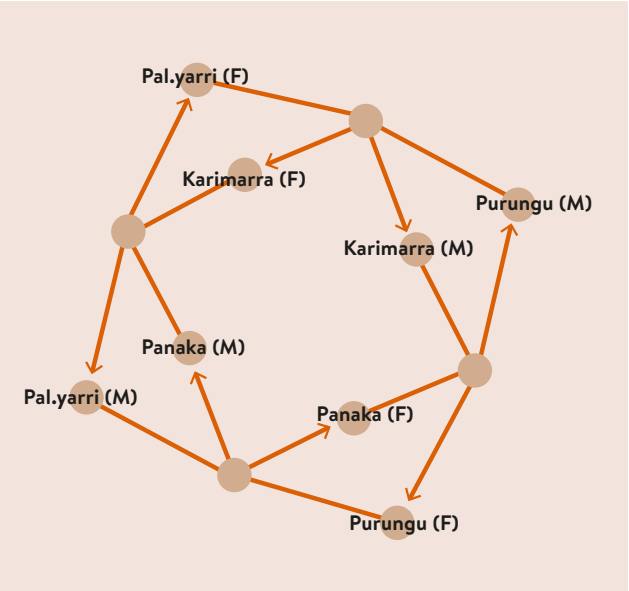


Figure 4.4.16: Indigenous Skin relationships are complex and determine partners and the identity of children.

HELPFUL ONLINE RESOURCES

Listen to Tracy Westerman discuss 'culture-bound' syndromes in Aboriginal Australians.
https://tinyurl.com/2p8jn3eh

CHECKING FOR UNDERSTANDING

Use the *psychological* and *social* elements of the Biopsychosocial model to discuss the influences on Aboriginal mental health and the experience of emotion.

CHECKING FOR UNDERSTANDING

1. **Many of the emotions experienced by sufferers of anxiety, depression and mood disorders are also experienced by people without mental illness. Explain the distinction between experiencing intense emotions and suffering from a disorder.**

2. **Describe the difference between Obsessions and Compulsions in sufferers of Obsessive-Compulsive Disorder.**

3. **Describe the *biological*, *psychological* and *social* benefits of exercise in managing emotions and reducing the likelihood of suffering from mental illness.**

4. **Tracy Westerman collected self-report data through the use of focus groups in her study into 'culture-bound' syndromes in Aboriginal communities. Explain the benefit of gathering data about emotions using focus groups.**

4.5 STUDYING EMOTION

- Experimental, observational, and qualitative designs may be used to study emotion.
- Methods of assessing psychological responses may be subjective or objective, quantitative or qualitative.
- People with emotional disorders are vulnerable. There are additional ethical and cultural issues associated with research and applications in the area of emotion.

2023 Subject Outline | Stage 1

When conducting psychological research into emotion, including physiological responses, subjective feelings, and expressive behaviours, it is essential that the most effective approach of data collection is implemented. These options are referred to as 'investigation designs', and determine the method undertaken to select participants, the techniques used to collect data and the conclusions that can be formed regarding the variables studied.

Experimental Design

An **experiment** is a systematic method of testing a hypothesis. It involves manipulating the **independent variable** to observe the effect of those changes on **dependent variable**. The experiment is designed to minimize bias and provide **reliable** and **valid** results. In a typical experiment, the researcher will select a sample of participants and then **randomly assign** them to either a treatment group or a control group. The treatment group will receive a specific intervention or manipulation, while the control group will not. The researcher then measures the effect of the independent variable and compares it to the control group to determine whether the intervention had a significant effect. The results of an experiment can be used to support or reject a **hypothesis**, leading to the determination of a **cause-effect link**. The validity of the findings can provide evidence for further research or application in real-world settings.

A series of experiments in emotion was conducted by Nadine Jung and colleagues from Justus Liebeg University in Germany. In one study, Jung was investigating the impact of induced emotional states on the participant's ability to solve a reasoning task. Results indicated that participants with a negative emotional state made more errors of logic when solving the reasoning problems.

In this study, the emotional state was the independent variable, which was purposely manipulated by the investigator. The dependent variable was the performance on the reasoning tasks. A cause-effect link between emotional state and reasoning ability was able to be determined.

Extraneous variables in psychology refer to any variables that are not the primary independent or dependent variables being studied, but which can affect the results of an investigation. These variables can be controlled by the researcher, or they may be outside of their control. When conducting an experiment the investigator has greater control over extraneous variables, which improves the validity and reliability of the results.

In Jung's study, she attempted to control the existing levels of positive and negative emotions in her participants by requiring them to complete an initial emotion survey called the Positive and Negative Affect Schedule.

Extraneous variables can also be minimised through the process of random allocation. Random allocation is a method used in psychology to assign participants to different groups in an investigation. In experimental research, the goal of random allocation is to ensure that all participants have an equal chance of being assigned to a particular group, which helps to eliminate bias and increase the validity of the study's results. The use of **random allocation** means that any differences between the groups are due to the intervention being studied, rather than differences in the characteristics of the participants.

HELPFUL ONLINE RESOURCES

Watch a video on Schachter and Singer's experiment on Enigmatic Emotions.
https://tinyurl.com/nhcykxfx

You can read more about Jung's series of emotion experiments here.
https://tinyurl.com/46a8xdkz

CHECKING FOR UNDERSTANDING

1. Explain three elements of experimental design that increase the validity and reliability of results.

2. Discuss two extraneous variables which could have influenced the results of Jung's study.

Observational Design

Observational design is a research method used in psychology where the researcher observes and records the behaviour of individuals or groups in their natural setting without any manipulation of variables. This method is used to gain insights into various psychological phenomena and helps to generate hypotheses for further investigation.

In some observational investigations, pre-determined categories of behaviour are utilised, whereas in others the investigator will observe and record behaviours as they occur, without preconceived beliefs or bias. In this way, an observational investigation design considers pre-existing variables.

Observational designs are useful in studying behaviours that are difficult to manipulate or control, such as the behaviour of animals or children. In studies of emotion, it is the expressive behaviours that can be observed that provide insight into the subjective feelings experienced by the participant.

While the experimental design is sometimes limited due to the consideration of ethical guidelines, observational methods may bypass some of these regulations, as the conditions are pre-existing, rather than applied upon participants by the investigator.

Imagine that a researcher was interested in the effect of playing violent video games on the emotional expression of young children. If conducted as an experiment, she would need to gather a sample of children and randomly assign them to groups – the experimental group where the participants would play violent video games, and the control group, where the participants would play non-violent video games. However, she is bound by the ethical guideline of ensuring her research doesn't cause any physical or psychological harm to her participants – which may very well occur in small children when exposed to violence and aggression in video games.

However, if this investigation was conducted as an observation, the researcher could utilise child participants who have already chosen to play the violent video games, before being recruited to the study. While potentially harmful to the child's emotional state, this behaviour occurred outside of and previous to the investigation, and is therefore not the responsibility of the researcher.

You may have already recognised through this example that the ability for the investigator to recruit a **random sample** is limited when conducting an observation. It is also much more difficult to control the extraneous variables that have the potential to reduce the validity of the results. For example, if this study was conducted in a laboratory, the investigator could manipulate the environmental

conditions, the length of gameplay, the type of game used and possibly screen children from pre-existing psychological disorders or personality traits. This level of control is not possible in observational research, which limits external validity – meaning that only a correlation can be determined, rather than a cause-effect link.

Another possible limitation of the observational design is **observer bias**. Observer bias refers to the systematic errors that occur when researchers unconsciously influence the results of their studies based on their own expectations or preconceptions. This can happen when researchers interpret or analyse results in a way that confirms their own beliefs, rather than objectively evaluating the data.

Qualitative Design

In psychology, **qualitative research** design involves the exploration of people's thoughts, feelings and behaviours and the way they describe and self-report them. This type of design involves collecting and analysing non-numerical data, such as interviews, observations, and written or visual materials, in order to identify themes, patterns, and relationships.

Qualitative research is often used to gain a deeper understanding of complex phenomena, such as emotions, attitudes, and cultural practices, and to generate hypotheses that can be further tested using quantitative research methods.

Common qualitative methods utilised in psychology include surveys, questionnaires, verbal interviews, **focus groups** and the **Delphi technique**. All techniques share the common goal of exploring the subjective experiences and meanings that people attach to their everyday lives.

Earlier in this chapter, Tracy Westerman's study into 'culture bound' syndromes was discussed. Her research into this phenomenon came from the utilisation of focus groups where Aboriginal Australians could discuss and explain their personal and cultural views on the way mental health is viewed and understood in their communities.

A benefit of collecting qualitative data is the richness of the information obtained. Participants are able to provide insight and an in-depth description of their thoughts, feelings, attitudes, and opinions. In a focus group scenario, opinions may be strengthened by the group setting and the desire of the participant to clearly articulate their beliefs in front of their peers.

CHECKING FOR UNDERSTANDING

1. Explain two advantages of conducting an observation.

2. Explain two limitations of conducting an observation.

3. Brainstorm a research topic that would be unethical to study as an experiment but could be studied as an observation.

HELPFUL ONLINE RESOURCES

Watch Michelle Obama and Will Ferrell conduct a focus group for young children.
https://tinyurl.com/2p85pe3r

Data types

QUANTITATIVE DATA

Quantitative data is numerical information that can be measured and analysed using mathematical and statistical methods. It is data that can be expressed in terms of numbers, quantities, or amounts.

An advantage of quantitative data is that results from different groups can be directly compared. Statistical analysis can be performed to determine elements such as the **mean** or the **standard deviation**. These measurements aid in determining the extent to which the results address the hypothesis. Experimental data is quantitative because the independent variable has been counted or measured in some way.

A disadvantage of quantitative data is that it lacks the depth and detail provided by qualitative data.

In studies of emotion, quantitative data could be obtained in the following ways:

Self-Report Measures: Participants may report on their experience of emotion using a numbered scale.

Physiological Measures: The physiological changes that accompany the experience of emotion may be measured using heart rate monitors, blood pressure cuffs or a polygraph machine.

Behaviour Counts: The expressive behaviours that accompany the experience of emotion can be counted while observing participants in a natural environment.

Neuroimaging Techniques: Quantitative data can also be collected through neuroimaging techniques, such as functional magnetic resonance imaging (fMRI) or PET scans. These techniques provide objective data on the brain's neural activity in response to emotional stimuli.

QUALITATIVE DATA

Qualitative data can be very useful in the study of emotions, as emotions are subjective experiences that are difficult to quantify using quantitative methods alone. Qualitative data allows researchers to gather rich, detailed information about individuals' emotional experiences, and can help to identify patterns, themes, and nuances in the way people feel and express their emotions.

Qualitative data can be gathered through a variety of methods, including interviews, focus groups, and written questionnaires. These methods allow researchers to explore emotions in context, and to understand how emotions are shaped by individual, social, and cultural factors.

In addition to providing insight into individuals' emotional experiences, qualitative data can also be used to explore the ways in which emotions are communicated and expressed. For example, researchers may analyse the language, gestures, and facial expressions used by individuals when discussing their emotions, in order to better understand how emotions are conveyed and interpreted in social interactions.

A limitation of qualitative data is that it can be time-consuming to analyse in order to identify themes and trends that address the research question. It is also difficult to make direct comparisons between groups without the use of numerical data.

HELPFUL ONLINE RESOURCES

This video describes the various methods of investigation in Psychology.
https://tinyurl.com/98ksuu5n

This clip clearly explains the difference between qualitative and quantitative data. https://tinyurl.com/benv88nm

SUBJECTIVE DATA

Subjective data in psychology refers to information or observations that are based on a person's personal feelings, perceptions, beliefs, and experiences, rather than on objective facts or measurements. This type of data is often gathered through interviews, questionnaires, or other methods that allow individuals to express their thoughts, feelings, and opinions.

Subjective data is typically collected through surveys or questionnaires, where individuals are asked to rate the intensity, frequency, and duration of their emotional experiences. These **self-report measures** may include **Likert scales**, where individuals report their emotions on a scale, or open-ended questions, where individuals are asked to describe their emotions in their own words.

CHECKING FOR UNDERSTANDING

Identify each of these examples as qualitative or quantitative data.

	Qualitative	Quantitative
Fatimah has an IQ of 134.		
Amber describes art as 'satisfying'.		
Nate considers himself a 'happy' person.		
Daniel indicated that his current self-esteem value was 8 out of 10.		
Year 12 students have an average ATAR of 80.6 points.		
Diezel thinks that the government should offer more support to Asylum Seekers.		
Noah appears scared when confronted by bullies.		
The investigator tallied 14 aggressive behaviours while watching children play.		
The heart rate monitor showed 73 beats per minute.		
The doctor explained the symptoms of OCD.		
Soldiers with PTSD participated in a focus group.		

Figure 4.5.1: Surveys and questionnaires provide subjective data, in either qualitative or quantitative form.

Researchers may also use qualitative methods, such as interviews or focus groups, to gather in-depth information about an individual's emotional experiences.

OBJECTIVE DATA

Objective data in psychology refers to information that can be observed and measured directly, without the influence of personal opinions, biases, or interpretations. This type of data is obtained through empirical methods, such as experiments, surveys, and standardized assessments, and is often quantifiable and replicable.

Examples of objective data in psychology include physiological measurements, such as heart rate and brain activity, behavioural observations, such as reaction times and response accuracy, and scores on standardized tests of cognitive ability, personality traits, or mental health symptoms.

Objective data is used in studies of emotion to measure physiological and behavioural responses to emotional stimuli. Physiological measures include measures of brain activity, heart rate, skin conductance, and hormonal responses, while behavioural measures include facial expressions, body language, and vocalizations.

For example, researchers might use brain imaging techniques such as functional magnetic resonance imaging (fMRI) to measure brain activity while participants view emotional images or videos. They may also use skin conductance measurements to assess the electrical conductance of the skin, which is sensitive to changes in emotional arousal.

Behavioural measures of emotion may involve coding facial expressions using standardized coding systems, such as the Facial Action Coding System (FACS). Researchers may also use observational methods to measure body language and vocalizations, such as measuring the pitch and volume of a participant's voice.

Ethical Guidelines when Investigating Emotion

Ethical guidelines are a set of standards psychologists must adhere to when conducting research to ensure the dignity and wellbeing of their participants is maintained. Ethical guidelines provide a framework for researchers to follow, ensuring that their studies are conducted in a way that protects the rights and welfare of participants.

The seven ethical guidelines that inform psychological research practices are:

- No physiological or psychological harm
- Informed Consent
- Voluntary Participation
- Withdrawal Rights
- Confidentiality
- No deception
- Debriefing

When conducting research into emotion, especially in individuals suffering from emotional disorders, adhering to ethical guidelines is of the utmost importance as participants may be more **vulnerable** than most. This means that, due to their emotional state, participants may not be able to provide informed consent, due to not truly comprehending the method to be undertaken. Similarly, vulnerable participants may not recognise when withdrawal is necessary to maintain their psychological wellbeing.

Researchers have added responsibility when researching with emotionally disturbed patients because these individuals are often in vulnerable and sensitive situations, and their emotional distress can impact their ability to make informed decisions.

Researchers must take special care to protect the rights and welfare of these patients, including obtaining informed consent in a way that is both ethical and legally sound, ensuring that the patient fully understands the potential risks and benefits of participating in the research, and protecting their privacy and confidentiality.

Additionally, researchers must be sensitive to the emotional needs of these patients and ensure that they are not subjected to any undue stress or harm during the research process. This may involve providing additional support and counselling services as part of the debriefing process.

When conducting research into emotions, it is important to be aware of cultural considerations, as emotions are shaped and expressed differently across cultures.

As discussed previously in this chapter, the way emotions are experienced and demonstrated varies significantly across cultures, and it is important for researchers to be aware of these differences and understand the cultural context. This can extend to the differences in language and vocabulary used to describe subjective feelings. Many measuring tools such as surveys, questionnaires and other tests may need to be translated for participants from countries different to that which the test was standardised in. It is vital to ensure that the language used maintains the same meaning when translated.

Researchers must also be sensitive to how emotions are expressed in different cultures, and how social norms dictate display rules and expressive behaviours. In some cultures it may not be appropriate to demonstrate emotions publicly; however, this does not mean the feelings that accompany that emotion are not being experienced.

Investigators need to be aware of potential biases in their samples due to cultural differences, as well as their own cultural biases and assumptions when conducting research into emotions. They should aim to remain open-minded and objective and be aware of the potential for their own cultural biases to influence their research findings.

CHECKING FOR UNDERSTANDING

1. Kerry opened the front door of her house to hear a massive shout of "Happy Birthday!" Her jaw dropped and tears filled her eyes as she began to shake. Her parents had organised a surprise party for her 18th birthday! With her heart beating faster than usual, she ran forward to give her Dad a big hug. Kerry was filled with gratitude and love. Identify the three components of Kerry's emotion of surprise.

Physiological Response:

Subjective Feelings:

Expressive Behaviour:

2. Provide your own example of each of the three components for the emotion of Sadness.

Physiological Response:

Subjective Feelings:

Expressive Behaviour:

3. Consider the image of the man's face. Explain which emotion he is experiencing and the characteristics of his facial expression that reflect this.

4. Explain the value of recognising microexpressions when having a conversation with your parents.

5. Explain why the validity of the Polygraph machine is limited.

CHECKING FOR UNDERSTANDING

6. Explain the example of happiness when achieving an A for a Psychology test using the Schachter-Singer model.

..

..

..

..

..

7. Consider the image of Plutchik's theory.

a) State the three levels of joy.

..

..

b) State an emotion that cannot be experienced at the same time as disgust.

..

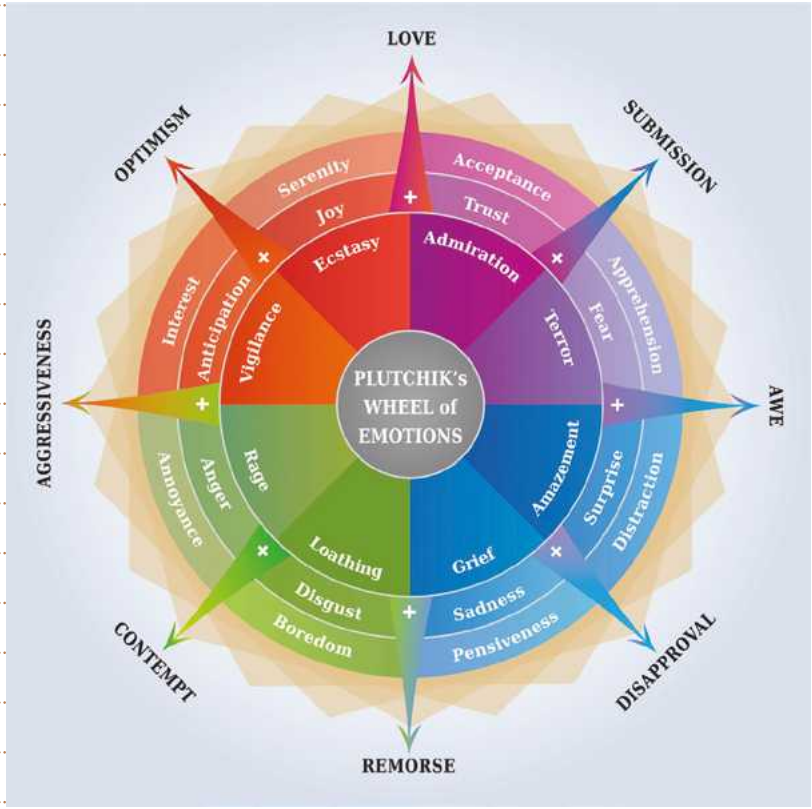
..

c) Give an example of a secondary emotion and explain what this means.

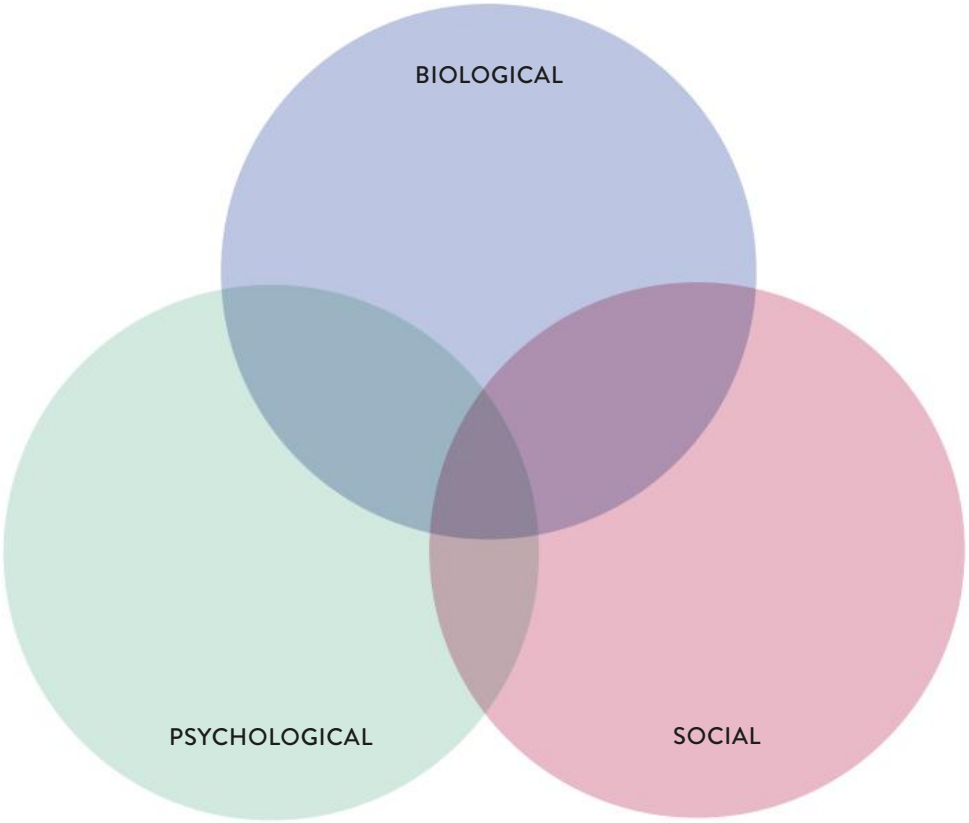
..

..

d) Explain the relevance of the different colour intensities in the diagram.



8. Brainstorm biological, psychological, and social influences on the experience of emotion.



9. Provide an example of how Display Rules in Australia differ in other countries or cultures.

10. Consider the image shown. Describe how you can interpret emotion through posture, eye contact and other elements of body language.

CHECKING FOR UNDERSTANDING

11. Discuss one way in which you have used technology to assist in the management of your emotions.

12. Explain one potential negative outcome of overuse of technologies such as smartphone apps and social media platforms.

13. Summarise how emotion is experienced differently in sufferers of Obsessive-Compulsive Disorder.

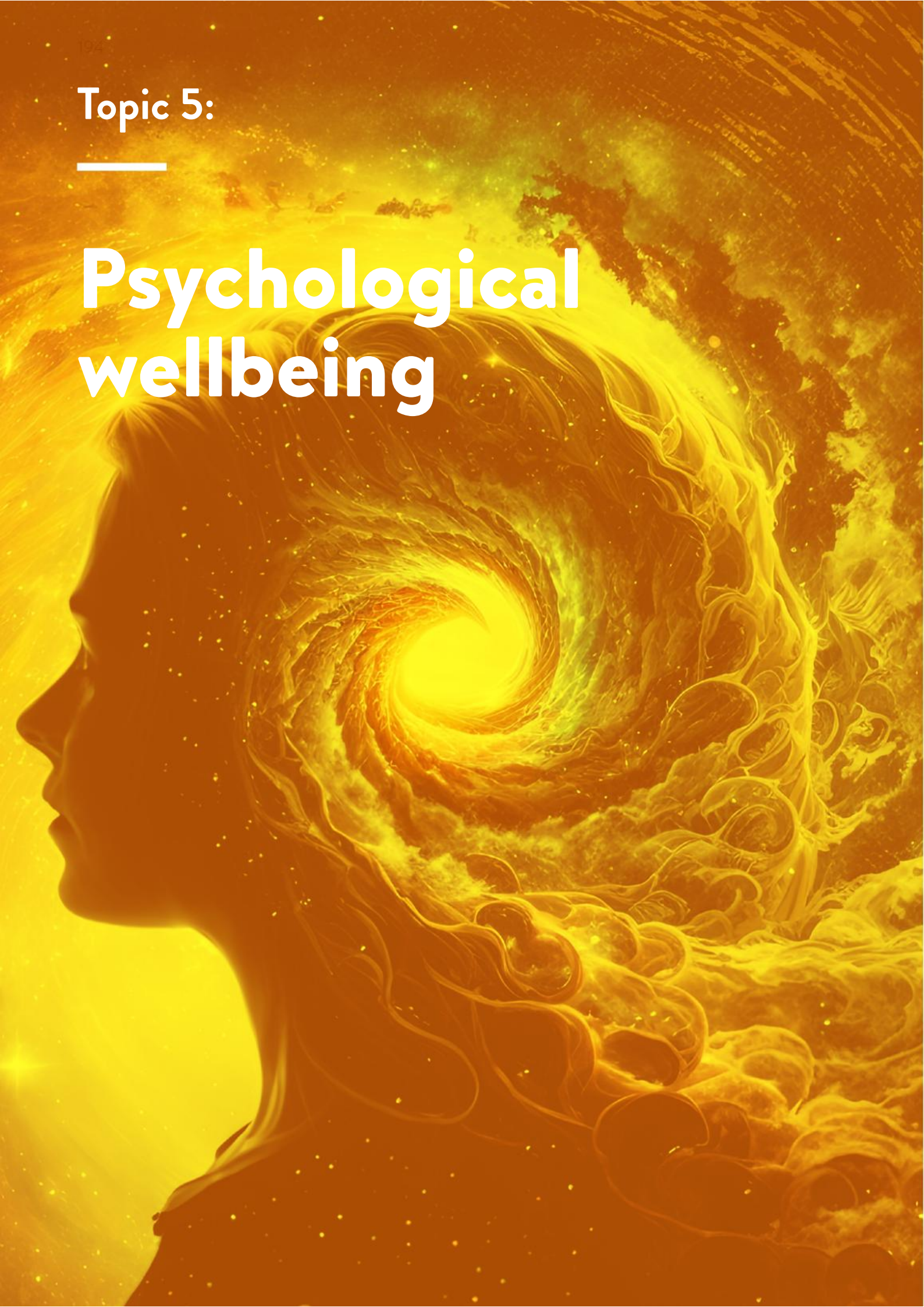
14. Explain how Exposure Therapy can be used to assist sufferers of specific phobias.

15. Suggest how depressive disorders can be treated biologically, psychologically, and socially.

16. Explain some of the additional ethical considerations when treating vulnerable patients with emotion disorders or difficulties.

Topic 5:

Psychological wellbeing



5.1 MENTAL HEALTH AND MENTAL ILLNESS

Mental health includes our emotional, psychological, and social wellbeing. It affects how we think, feel, and act. It also helps determine how we handle stress, relate to others, and make choices.

Learning objectives:

- Learning objective: Explain the differences between mental health and mental illness.

2023 Subject Outline | Stage 1

The terms mental health and mental illness are quite often used synonymously; however, they have very different meanings. Mental health and mental illness are not the same thing. Mental health refers to our emotional and psychological sense of wellbeing and affects how we think, feel, respond to challenges, and interact with others. Mental health is an integral and essential component of health. The WHO constitution states: "Health is a state of complete physical, mental and social well-being and not merely the absence of disease. Mental health is a state of wellbeing in which an individual realises his or her own abilities, can cope with the normal stresses of life, can work productively and is able to make a contribution to his or her community" (World Health Organization).

On the other hand, mental illness refers to a diagnosable illness that affects an individual's mood, emotions, behaviour and perception. A mental illness can often be characterised by having significant impact or disturbance in functioning. The Diagnostic and Statistical Manual (DSM-5) defines "mental illness" as "... syndrome[s] characterized by clinically significant disturbance[s] in an individual's cognition, emotion regulation, or behaviour that reflects a dysfunction in psychological, biological, or developmental processes underlying mental functioning. Mental illness/disorders are usually associated with significant distress or disability in social, occupational, or other important activities. (American Psychiatric Association, 2013, p. 20).

The DSM-5-TR is the most recent publication listing a set of diagnostic criteria that indicates symptoms that must be present (and for how long) as well as a list of other symptoms, disorders, and conditions that must first be ruled out to qualify for a particular diagnosis. While these criteria help increase diagnostic reliability (i.e., the likelihood that two doctors would come up with the same diagnosis when using DSM to assess a patient), it is important to remember that these criteria are meant to be used by trained professionals using clinical judgment; they are not meant to be used by the general public (American Psychiatric Association, 2013, p. 2)

In an effort to improve diagnosis for people of all backgrounds, the DSM-5 incorporates a greater cultural sensitivity throughout the manual. Rather than a simple list of culture-bound syndromes, DSM-5-TR updates criteria to reflect cross-cultural variations in presentations, gives more detailed and structured information about cultural concepts of distress, and includes a clinical interview tool to facilitate comprehensive, person-centred assessments. The cultural interview guide will help clinicians to assess cultural factors influencing patients' perspectives of their symptoms and treatment options. It includes questions about patients' background in terms of their culture, race, ethnicity, religion, or geographical origin. This helps us to understand the role cultural plays in both the development of mental illness but also in help seeking behaviours. This concept aligns to the Biopsychosocial model which we will explore in more detail in the following section.

Both mental health and mental illness are experienced across a spectrum (see Figure 5.1.1) with some individuals having challenges with their mental health but the absence of a mental illness. Likewise, many people experience mental illness but have good mental health and live a highly functionable life. It is also important to recognise that most of us will inevitably experience a bad patch where nothing in life seems to be going well or we feel down or struggle to manage the balance between schoolwork, jobs, peer interactions and parental expectations. This experience is normal and usually temporary therefore, does not imply an individual is experiencing mental illness.

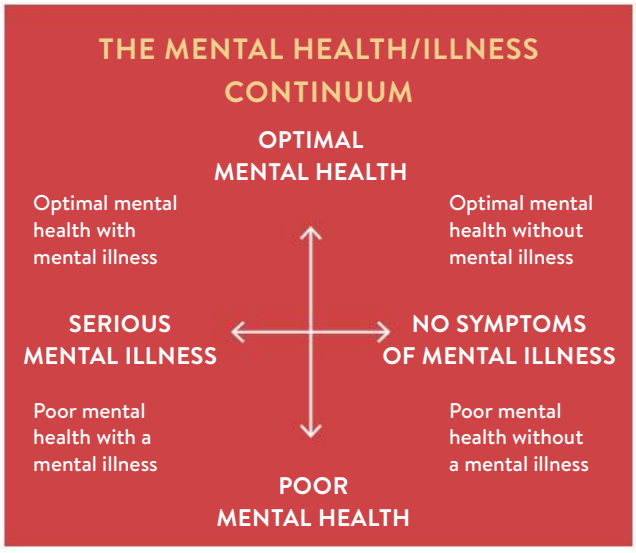


Figure 5.1.1: Mental Health/Illness continuum.

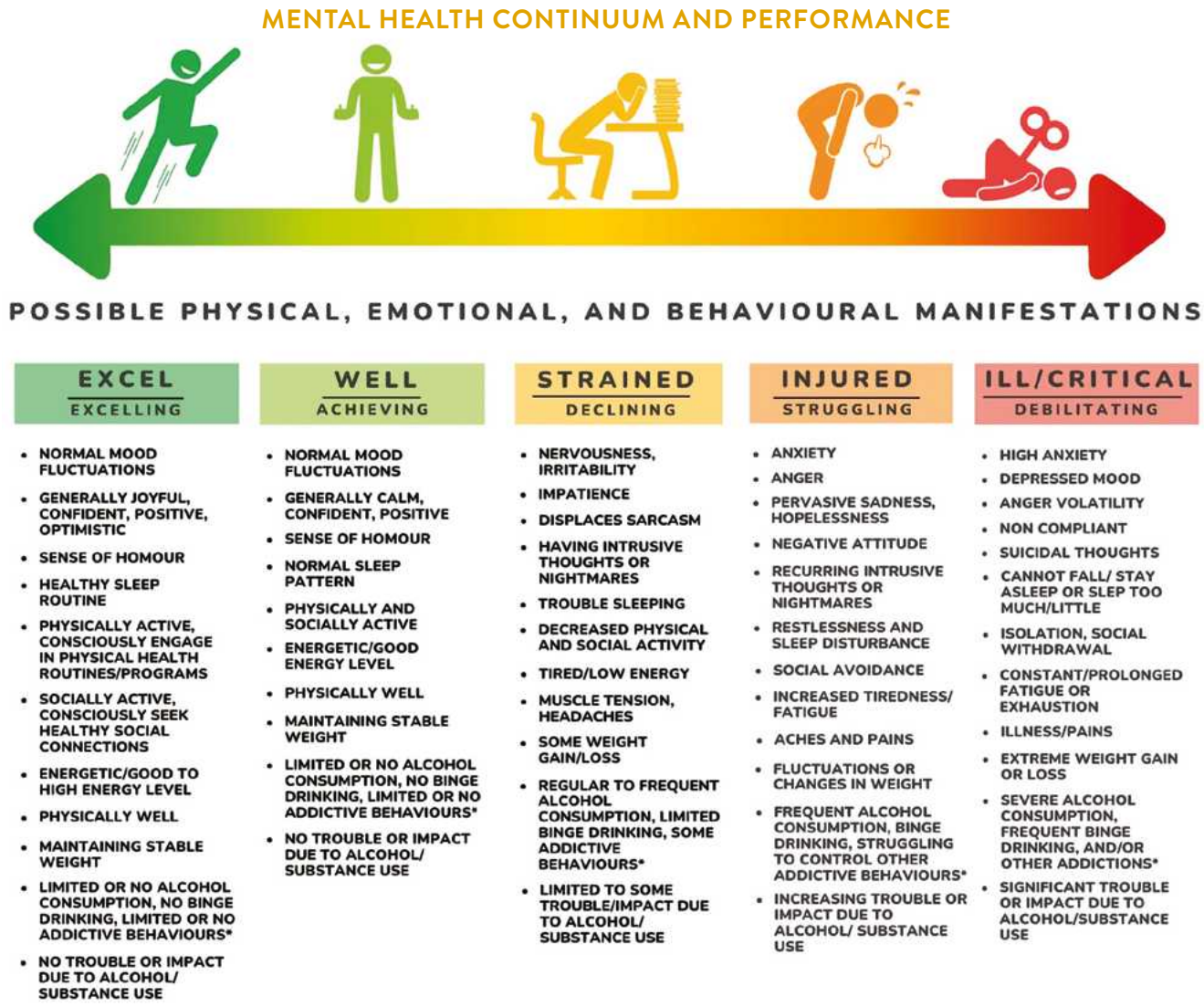


Figure 5.1.2. Spectrum of mental health functioning.

Figure 5.1.2. takes a closer look at the Mental Health continuum and outlines a range of potential indicators of both good mental health compared to the end of the spectrum indicating mental illness.

CHECKING FOR UNDERSTANDING

Extended Response: Discuss at least one biological, psychological and socio-cultural behavioural manifestations that would indicate that an individual is experiencing a decline in their wellbeing.

POSSIBLE TEACHING CONSIDERATIONS

Individual Research activity

Develop the timeline to show historical changes that have occurred in the acceptance and treatment of mental Illness since the 18th Century.

In the Middle Ages, behaviours associated with mental illness were considered to be caused by demonic possession with Exorcism being the treatment.			

Explore some cultural differences in the concept of mental health and mental illness. Insert your findings in the table below.

MENTAL HEALTH	MENTAL ILLNESS

HELPFUL ONLINE RESOURCES

Watch the following Ted Talk by Dr. Jessica Dere explaining how culture makes a difference when thinking about mental health and mental illness.
https://tinyurl.com/yvnphztw

CHECKING FOR UNDERSTANDING

What role does culture play in the development of mental illness?

5.2 THE BIOPSYCHOSOCIAL EXPLANATION OF MENTAL ILLNESS

Mental health can be analyzed and described in terms of biological, psychological, and sociocultural factors.

Learning objectives:

- Describe the biopsychosocial dimensions of wellbeing.
- Describe the biopsychosocial dimensions of resilience.

2023 Subject Outline | Stage 1

In the past, mental illness was treated based on a biological model which assumed that all mental illness was caused by biological dysfunction of the brain. Dysfunction was attributed to abnormalities in biochemistry, changes in brain structure due to injury or disease, infection causing deterioration of the brain or genetics. Therefore, a biological illness would be treated with the use of medication, surgery or in some instances the use of Electroconvulsive Therapy (ECT). Engel (1977) argued that there were several factors beyond the biological dimensions that contributed to the development of mental illness or poor mental health such as psychological and socio-cultural factors. Engle's model is known as the Biopsychosocial model (BPS) and has become influential in understanding the development of mental illness and how these risk factors can be minimised through preventative programs or behavioural habits. Figure 5.2.1. shows a range of factors in each dimension that can be considered either a risk or protective factor.

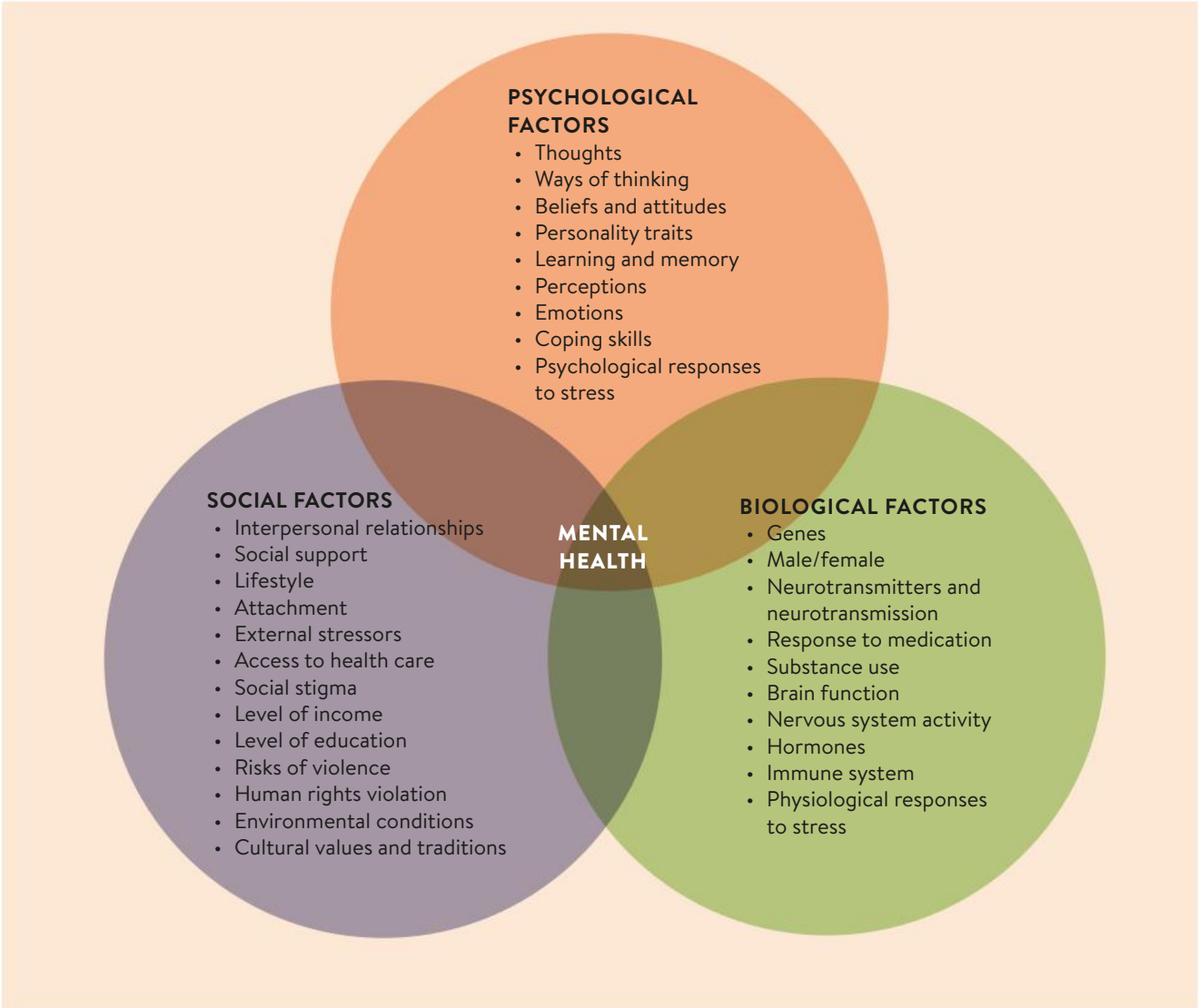


Figure 5.2.1: Biopsychosocial dimensions of Mental Health.

Engel suggested that the dimensions do not work in isolation; rather, the interaction across dimensions better explains the complex development of mental illness.

Psychological factors can impact mental health such as, childhood abuse, neglect, trauma, social isolation, self-esteem, and perception amongst others. Trauma is a useful example to demonstrate the complexity of the BPS model. An individual who has experienced trauma may experience challenges on a psychological basis resulting in confronting memories, nightmares, sadness, or fear and changed beliefs based on their experience. However, scientists have identified a link between trauma and changes in the brain. Brain areas affected can include the amygdala, hippocampus as well as the pre-frontal cortex. Due to the prolonged exposure to stress, some individuals may have increased cortisol and noradrenaline which leaves them more vulnerable to stress related disorders and often requiring less stimulus to activate the stress response (**see Topic 2 for more detail**). Therefore, while trauma is typically initiated by the psychological dimension, it has direct links to biological responses. However, the socio-cultural dimension also plays a significant role in trauma. For instance, social stigma around mental health or familial interactions related to the incident may discourage individuals from accessing support services. In some cases, individuals may be prevented from reaching out for support due to various socio-cultural factors. This can leave the individual at increased risk of exposure to multiple traumas or developing maladaptive coping mechanisms to help manage the distress of their experience. It is important to note that not everyone who experiences trauma develops mental illness, likewise not everyone who has a genetic predisposition will develop mental illness. This phenomenon is due to a concept referred to as Individual differences which attempts to explain the uniqueness of individuals regardless of predisposition. While the BPS model helps practitioners to determine factors contributing to the development of mental illness, the model also allows practitioners to identify protective factors that may help protect against the development of a mental illness. Protective factors could include but are not limited to, individuals with effective coping skills, supportive family, peers, regulated SNS, access to support systems, no family history of mental illness or trauma. The BPS model can be used to help explain human behaviour.

HELPFUL ONLINE RESOURCES

Listen to the presentation by Innika Ackerley explaining the Biopsychosocial approach.
https://tinyurl.com/4hd38rh4

HELPFUL ONLINE RESOURCES

Research "**The Diathesis Stress Model**" to read more about the interaction between inherent vulnerability and environmental factors that leave some more or less vulnerable than others.

EXTENSION ACTIVITY

Read the following information and make some notes on the link between education and mental health. https://tinyurl.com/5n9y2u3c

1. Which dimension of the Biopsychosocial model does Education correspond?

2. Discuss the role of one Socio-cultural factor, other than culture, in the development of mental illness.

CHECKING FOR UNDERSTANDING

Scenario 1: You have been working with Jo in Science on a project that needs to be submitted in 3 days' time. Jo has always been enthusiastic and contributed equally to the project. However, recently Jo has missed several deadlines and has been late to meetings. Jo confides in you and lets you know that they have recently broken up with their partner of two years which has resulted in Jo spending more and more time alone replaying everything over in their mind that might have caused the breakup. Alongside this, Jo's mother has experienced a deterioration in her mental health and relies on Jo to do the shopping and household chores. Jo is struggling to cope and worries that they too will develop anxiety. Jo's father is not around for support as he passed away when Jo was 7 years old.

Discuss the biopsychosocial factors in the scenario that could leave Jo at risk of developing poor mental health.

CHECKING FOR UNDERSTANDING

Scenario 2: Sam developed depression shortly after their parents divorced, which resulted in Sam going back and forth between each house and never really feeling a sense of belonging or being settled in either place. Over the following few months at school Sam found it difficult to stay connected with peers and engage with them face to face due to the expectation of spending time with a parent over the weekend. Thankfully, both of Sam's parents noted this and encouraged Sam to engage with peers and they worked around a plan to ensure that everyone in the family had their social and emotional needs met, despite being separated. Sam had a great mentor at work who was a few years older and provided regular support to Sam. At one stage they suggested Sam reach out to the school counsellor or their GP for professional help in managing Sam's declining mental health. Over the period of 12 weeks Sam had engaged with their GP and was prescribed a low dose of anti-depressants, alongside a referral to a psychologist. Sam has made a great connection with the psychologist and is engaging in fortnightly support sessions in addition to joining a local youth support group. Sam and their care plan team had noted significant improvement in Sam's recovery at her annual review.

Discuss the Biopsychosocial factors that may have contributed to Sam's recovery.

Biopsychosocial dimensions of Resilience

Figure 5.2.2: Resilience.

The concept of resilience has become an umbrella term for factors that reduce the impact of adversity. The concept came into use by health professionals who identified children who had developed into functional and well adapted adults despite having experienced adversity throughout childhood.

In your own words, write a definition of resilience.

How resilient are you?
Take the test and find out.
https://www.idrlabs.com/personal-resilience/test.php

SCIENCE INQUIRY SKILLS

Discuss the reliability and validity of the IDR-PRT resilience measure.

HELPFUL ONLINE RESOURCES

Watch the video clip to find out why resilience is so important.
https://tinyurl.com/5c7tdzf6

Identify the resilience factors that enabled Asha to "bounce back" after her injury.

Biopsychosocial dimensions of resilience

Historically clinicians and government health agencies have used the BPS model to explain individual differences in our vulnerability to the development of disease or poor mental health. More recently, the BPS model is applied to help clinicians and health professionals to identify and understand the impact of protective factors, otherwise known as resilience. You may also hear people talking about the capacity to bounce back after experiencing challenges, they are referring to resilience.

The APA defines resilience as "the process and outcome of successfully adapting to difficult or challenging life experiences, especially through mental, emotional, and behavioural flexibility and adjustment to external and internal demands" (American Psychological Association).

The biopsychosocial dimensions of resilience refer to the various factors that influence an individual's ability to cope with and adapt to challenging life events. These dimensions include biological, psychological, and social factors. On the biological level, resilience is related to the functioning of the nervous and endocrine systems, as well as genetic and epigenetic factors. Psychological factors that affect resilience include coping skills, problem-solving abilities, and sense of self-efficacy. Social factors such as supportive family and friends, access to resources, and social support networks also play a role in resilience. Together, these dimensions of resilience work together to create an individual's capacity for resilience in the face of adversity.

Scenario: Jo is a recent high school student who recently experienced a traumatic event. Use the BPS model to explain how Jo is resilient.

Explanation: On a biological level, Jo's nervous and endocrine systems are functioning in a way that allows them to cope with the stress and trauma of this event. On the psychological level, Jo has a strong sense of self-efficacy and is able to use problem-solving skills to make sense of the experience. On the social level, Jo has access to supportive family and friends, as well as social support networks that can provide additional resources and guidance. Considered together, these biopsychosocial factors give Jo the resilience they need to move through

the traumatic experience and come out stronger on the other side. Look back to Figure 5.2.1 to review other factors within the domains that may have contributed to Jo's level of resilience. REMINDER: Any factor that is considered a risk factor may also be a protective factor.

CHECKING FOR UNDERSTANDING

Use Figure 5.1.2 on p192 and 5.2.1 on p195 to allocate the following factors of resilience in the appropriate space provided.

- regulated stress response
- good physical health
- finanical security
- stable home
- optimistic
- good temperment
- access to support
- good coping strategies
- good self-esteem
- sound problem solving skills

BIOLOGICAL

PSYCHOLOGICAL

SOCIOCULTURAL

Can you think of two more factors to add into each dimension?

WHY IS RESILIENCE IMPORTANT?

- Resilience leads to improved learning and academic achievement.
- Resilience is related to lower absence from school or work due to sickness and stress.
- It contributes to reduced risk taking behaviours including excessive drinking, smoking and the use of drugs.
- Higher resilience is related to a lower rate of mortality, increased physical health, and boosts immune functioning.

Contemporary research on resilience by Shi et al, (2018) examined the relationship between resilience and mental health outcomes in a sample of Chinese adolescents. They found that greater resilience was associated with better mental health, including lower depression and anxiety symptoms, as well as higher quality of life. These findings suggest that resilience is important for promoting mental health in adolescence.

CHECKING FOR UNDERSTANDING

How might a young people respond to failure in an exam if they had low resilience?

DIMENSIONS OF RESILIENCE

Physical
Nourishing/nurturing your body

Emotional
Actively working on self awareness and self management

Mental
Taking control of thinking and action

Social
Investing in connections and relationships

Spiritual
Nourishing/nurturing your 'spirit'

Resilience is not a trait, it is a capacity that involves behaviours, thoughts and actions that can be learned

Figure 5.2.3: Dimensions of resilience.

Figure 5.2.4: Resilience traits.

Individuals who are described as resilient commonly possess specific traits, see Figure 5.2.4. below. However, it is important to note that resilience traits vary between individuals and can be developed and further enhanced both by experience and training.

HELPFUL ONLINE RESOURCES

Enhancing resilience.
Use the following link to outline the key aim of the Penn Resilience program.
https://tinyurl.com/46jtzp8s

Identify the key aspects of resilience that the program is designed to build.

1.

2.

3.

4.

5.

6.

HELPFUL ONLINE RESOURCES

Research "The PERMA resilience model using one of the links below, or you can find your own.
https://tinyurl.com/3hers6vt

How does the PERMA model align to the BPS model?

EXTENSION ACTIVITY: REAL WORLD APPLICATION:

School-based prevention of depressive symptoms: A randomized controlled study of the effectiveness and specificity of the Penn Resiliency Program. **https://tinyurl.com/ysrkdt28**

HELPFUL ONLINE RESOURCES

Watch the TEDx Talk by Teresse Lewis discussing how to build resilience using the dimensions of the BPS modal.
https://tinyurl.com/mpbeapxw

SCIENCE INQUIRY SKILLS

SIS: Design a study to examine the effectiveness of PENN resiliency program in schools.

5.3 HUMAN FLOURISHING

Learning Objective:

- An important factor in human flourishing is maintaining close relationships with others.

2023 Subject Outline | Stage 1

The APA defines Flourishing as "a condition denoting good mental and physical health: the state of being free from illness and distress but, more important, of being filled with vitality and functioning well in one's personal and social life". (American Psychological Association, 2023).

LEARNING ACTIVITY

Identify at least three different types of relationships that you have and enter them into the box below followed by the functions/benefits that they bring.

RELATIONSHIP	BIOLOGICAL	PSYCHOLOGICAL	SOCIAL-CULTURAL

The 2021 World Happiness Report (2022) found that people who felt closer to other people during the pandemic were happier and had experienced greater life satisfaction, more resilience, and better mental health. Connecting with other people also lowers health risks and improves physical health and length of life.

According to Maslow's Hierarchy of Needs, human connection is a fundamental need to maintain a sense of belonging and love (see Figure 5.3.1). Connections with family and friends provides us with a sense of emotional and psychological security and happiness which helps in fostering human flourishing. This in turn can provide a strong foundation for overall wellbeing. Additionally, strong relationships can lead to increased levels of self-esteem, improved communication skills and a greater capacity for empathy and understanding. These benefits can be attributed to the mutual respect and trust that are often developed in close relationships. Furthermore, relationships can provide individuals with a platform

Figure 5.3.1 Maslow's Hierarchy of Needs.

to exchange ideas, discuss experiences, and gain new perspectives. This can result in improved problem-solving skills and a greater sense of autonomy and personal growth. Ultimately, maintaining close relationships with others is an integral part of achieving flourishing in human life.

REAL WORLD CONTEXT

Psychological research has demonstrated the importance of maintaining close relationships with others as a factor in achieving human flourishing. For instance, a case study by Chien, Hsu, and Yang (2012) examined the role of close relationships in the recovery of individuals with complex mental illnesses. The study included 50 individuals with a diagnosis of schizophrenia, bipolar disorder, or major depressive disorder who were receiving out-patient treatment. Results revealed that individuals who had supportive relationships with family and friends reported greater psychological functioning, as measured by the Global Assessment of Functioning scale. Additionally, the study found that individuals with stronger relationships with others experienced increased levels of self-esteem and social support providing further credibility for the role of close relationships in human flourishing.

The Case of Genie (The wild child): Genie was born in 1957 to a severely neglectful and abusive home. Genie was neglected to such an extreme degree that she was not exposed to language until she was 13 years old. Despite her late start in language, Genie eventually learned to speak, read, and write. However, she was never able to learn the nuances of communication and social relationships. Although she was able to learn the basics of language, her lack of human connection and support in her early life prevented her from developing the skills needed to build relationships and interact with others. This case study provides evidence of the importance of human connections to flourish; Genie was unable to make up for the lack of connection and support she was denied in her early life.

The Case of John: John was born in 1964 to a family in which he was the youngest of four children. He had a difficult relationship with his father, who was often absent and distant. When John was 14 years old, he moved away from home to live with his aunt and uncle. While living there, John developed close relationships with his aunt and uncle, who provided emotional support and guidance. John flourished academically and socially.

CHECKING FOR UNDERSTANDING

In your own words, briefly explain what the case studies and research tell us about human flourishing?

HELPFUL ONLINE RESOURCES

PLEASE NOTE THE CONTENT MAY BE DISTRESSING FOR SOME VIEWERS AS IT PROVIDES INFORMATION OF HER ABUSE AND NEGLECT BY HER PARENTS.

You can read the full case study of Genie by clicking on the link/QR code below. https://tinyurl.com/msspr7mt

You can watch a documentary about Genie below. AGAIN, PLEASE NOTE THIS MAY CAUSE SOME DISTRESS. https://tinyurl.com/mr3tnjxe

Consider how the COVID-19 pandemic may have affected our ability to flourish given connections were impacted with isolation being enforced. Note your responses below:

1.

2.

3.

4.

The COVID-19 pandemic had a huge impact on our ability to flourish, particularly in terms of our connections with others. With isolation being enforced, we no longer had the opportunity to interact and connect with others in the same ways as we used to. This has had a major effect on our mental and emotional wellbeing, which can make it difficult to feel content and thrive. Many struggled, while others were creative in constructing alternative ways to stay connected to friends and family, through online platforms or by finding other activities that allowed them to safely socialize. By taking the initiative to reach out and build relationships, we can still experience joy and growth in our lives, even in such challenging circumstances.

There is a wealth of evidence for the change in human interactions during the pandemic. One example is a study published in the journal Nature Human Behaviour in 2020, which found that social interactions declined by an average of 25% during the first wave of the pandemic. Additionally, a survey conducted by the Australian Psychological Association in 2020 found that social distancing has had a negative impact on emotional wellbeing, with 66% of respondents reporting feeling lonely or isolated. These studies show that the pandemic has significantly disrupted our social lives and interactions with others, which can have a major impact on our overall wellbeing.

SCIENCE AS A HUMAN ENDEAVOUR

During the COVID-19 pandemic, the Australian government worked closely with Non-Profit Organizations (NFPs) to support people affected by the pandemic. The government provided funding and resources to NFPs, which played a critical role in responding to the immediate needs of communities, such as providing food and financial assistance to those in need.

For example, NFPs such as Foodbank and SecondBite, which work to reduce food waste and address food insecurity, received increased funding from the government to help distribute food to those affected by the pandemic, including the unemployed and those on low incomes. The government also partnered with NFPs, such as the Salvation Army and St Vincent de Paul Society, to provide financial assistance and support services to those in need, including the homeless and those struggling to pay their bills.

Additionally, the government worked with NFPs in the health sector, such as the Australian Red Cross, to assist with the rollout of the COVID-19 vaccine and to provide support to those in quarantine. NFPs also played a vital role in providing mental health support to people affected by the pandemic, such as those who have lost their jobs, were experiencing stress and anxiety.

In conclusion, the collaboration between the Australian government and NFPs was crucial in addressing the impacts of the COVID-19 pandemic and supporting those in need.

SCIENCE AS A HUMAN ENDEAVOUR

After reading the excerpt above, OR from the online document provided in the link below:

https://tinyurl.com/ykja8wbx

Discuss the evidence for at least one of the following SHE concepts:

- Communication and Collaboration
- Influence
- Development and Application

POSSIBLE TEACHING CONSIDERATION

Communication style can have a significant impact on relationships, both positive and negative. Effective communication is an important factor in building and maintaining strong, healthy relationships, while poor communication can lead to miscommunication, conflicts, and even the breakdown of relationships.

Objective: The student will be able to explain how relationships can be affected by assertiveness training and the four styles of responding to others.

1. Watch the following video titled "How To Be Assertive: Assertive Communication & DBT Interpersonal Effectiveness Skills".

https://tinyurl.com/5ss2hemy

Notes:

2. Read the article titled "The Four Styles of Responding" and note characteristics of each style below.

https://tinyurl.com/27ajfrus

Active constructive	
Passive constructive	
Active destructive	
Passive destructive	

Identify the following communication style and explain the impact it might have on the receiver.

STATEMENT	STYLE	IMPACT
"I think you need to spend more time on this project."		
"I like the way you handled that situation."		
"That's not the right way to do it."		
"You could have done it better."		
"That was a great job."		

	ACTIVE	PASSIVE
CONSTRUCTIVE	• Enthusiastic support • Eye contact • Authentic Great news! I knew you'd do it. How do you feel?	• Passive • Low energy • Delayed response • Quiet Oh cool, that's nice... good for you.
DESTRUCTIVE	• Quashing the event! • Dismissive • Demeaning I don't believe you! It sounds stressful.	• Turns focus inward • Avoiding • Ignore speaker Huh. Well, I just got a new video game.

Figure 5.3.2. Illustrating the four styles of communication.

Solutions: 1. Active destructive 2. Passive constructive 3. Active destructive 4. Passive destructive. 5. Active constructive.

5.4 CHARACTER STRENGTHS AND VIRTUES VS THE DSM-5

Learning objectives:

- Compare and contrast the CSV with the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5) used in traditional psychology.
- Describe how the VIAIS could be used.

2023 Subject Outline | Stage 1

CSV VS DSM-5

The DSM-5-TR is a widely used diagnostic manual that provides a standardised language and criteria for diagnosing mental health disorders. It is based on the biomedical model of mental illness and is used by mental health professionals as a reference guide to make clinical diagnosis and treat mental illnesses. The DSM-5 organises disorders into categories based on their symptoms and potential causes and provides a specific set of criteria for each disorder, including symptoms, duration and age of onset. It is regularly updated to reflect the latest research and understanding of mental disorders and has been heavily criticised for its biomedical approach, which is seen by some as reducing the complexity of human experiences with diseases to a collection of symptoms. The CSV (Character Strengths and Virtues) framework is a positive psychology framework developed by Christopher Peterson and Martin Seligman in 2004. The framework was created as a response to the requirement for a more comprehensive classification of positive human traits. The classification serves as a complement to the Diagnostic and Statistical Manual ofMental Disorders (DSM), which focuses primarily on mental illnesses and disorders. In comparison, the CSV framework identifies 24 character strengths and six virtues that are universally valued across cultures and religions. The character strengths are defined as positive traits that contribute to an individual's personal growth and fulfillment, while the virtues represent higher order, overarching positive traits that encompass multiple character strengths. The six virtues are:

1. **Wisdom and Knowledge:** creativity, curiosity, judgment, love of learning, perspective.
2. **Courage:** bravery, honesty, perseverance, zest.
3. **Humanity:** kindness, love, social intelligence.
4. **Justice:** fairness, leadership, teamwork.
5. **Temperance:** forgiveness, humility, prudence, self-regulation.
6. **Transcendence:** appreciation of beauty and excellence, gratitude, hope, humour and spirituality.

CHECKING FOR UNDERSTANDING

Discuss the key differences between the DSM and the CSV.

Figure 5.4.1 The 24 Character Strengths and Virtues.

Tick the characteristics that you believe align to you.

Complete the VIA survey and note your results below. https://www.viacharacter.org/

WHAT ARE THE BENEFITS OF KNOWING YOUR CHARACTER STRENGTHS?

There are several personal benefits to knowing our strengths via the Character Strengths and Virtues (CSV) framework. Here are some potential benefits:

Increased self-awareness: Understanding our strengths can help us develop a better understanding of ourselves, our values, and what is important to us. This can help us make more informed decisions, set goals that align with our values, and improve our overall well-being.

Improved relationships: When we are aware of our strengths and those of others, we can better appreciate and respect the unique qualities of those around us. This can lead to improved relationships, better communication, and a greater sense of connection with others.

Increased resilience: Knowing our strengths can help us navigate challenges and setbacks more effectively. By leveraging our strengths, we can build on our positive qualities and find ways to overcome obstacles and setbacks.

Enhanced performance: When we use our strengths, we are more likely to be engaged, motivated, and perform at a higher level. This can lead to increased success in our personal and professional lives.

Greater well-being: When we focus on our strengths, we are more likely to experience positive emotions, greater life satisfaction, and an overall sense of well-being. By cultivating our strengths, we can build on our positive qualities and lead a more fulfilling life.

Figure 5.4.2: Word cloud demonstrating CSV.

CHECKING FOR UNDERSTANDING

Select a world leader, politician or celebrity and identify their character strengths. Provide a brief explanation or scenario to justify your selection of strengths.

HOW CAN THE CSV BE UTILISED IN THE CLASSROOM?

Character strengths and virtues (CSV) can be a valuable tool for educators to promote the holistic development of their students. By incorporating CSV into the classroom, teachers and academics can help students to develop their strengths, build positive relationships with others, and achieve academic success.

Here are some ways that CSV could be used in the classroom:

- **Self-Assessment:** CSV can help students to identify their unique strengths and virtues. Teachers and academics can provide students with tools and resources to assess their own character strengths, such as the VIA Survey. This can help students to better understand their own personality and behaviours, and how they can use their strengths to achieve their goals.
- **Goal Setting:** Once students have identified their strengths, teachers and academics can work with them to set goals that align with their strengths. For example, a student who is highly creative might set a goal to create a piece of artwork or write a story. By setting goals that align with their strengths, students are more likely to be motivated and engaged in the learning process.

- **Classroom Culture:** Teachers and academics can use CSV to create a positive classroom culture that values and celebrates the strengths and virtues of all students. This can involve acknowledging and celebrating the strengths of individual students, as well as incorporating CSV concepts into classroom activities and discussions. This can help to foster a sense of belonging and community within the classroom.

- **Social-Emotional Learning:** CSV can be incorporated into social-emotional learning (SEL) activities to help students build positive relationships with others. For example, students could be asked to identify and appreciate the strengths of their classmates, or to work collaboratively on a project that requires the use of different strengths. By developing an understanding of their own and others' strengths, students can learn to appreciate and respect the unique qualities that each individual brings to the classroom.

HELPFUL ONLINE RESOURCES

YouTube 'Science of character'
https://tinyurl.com/2m7x9rek
THINK-PAIR-SHARE

REAL WORLD CONTEXT:

What would be the benefit of implementing the CSV in the workplace?

See how your answer aligns to the information below.

Using the Character Strengths and Virtues (CSV) framework in the workplace can have numerous benefits for both employees and organizations. Some potential benefits include:

- **Increased employee engagement:** When employees are encouraged to use their strengths at work, they are more likely to be engaged in their work and feel a sense of purpose and fulfillment. This can lead to increased job satisfaction and motivation.

- **Improved teamwork:** When individuals are aware of their own strengths and the strengths of their colleagues, they can work more effectively as a team. By leveraging each other's strengths, team members can better collaborate, communicate, and problem-solve together.

- **Enhanced leadership:** The CSV framework can be used to help develop effective leaders. By identifying and cultivating leadership strengths, such as courage, wisdom, and justice, individuals can become more effective leaders and positively impact their teams and organizations.

- **Positive workplace culture:** By promoting positive character traits and virtues, the CSV can help create a positive workplace culture. This can lead to a more supportive, respectful, and inclusive workplace environment where employees feel valued and respected.

- **Improved performance:** When employees are using their strengths and feel engaged and motivated at work, they are likely to perform better. This can lead to increased productivity, innovation, and overall organizational success.

REFLECTION TASK

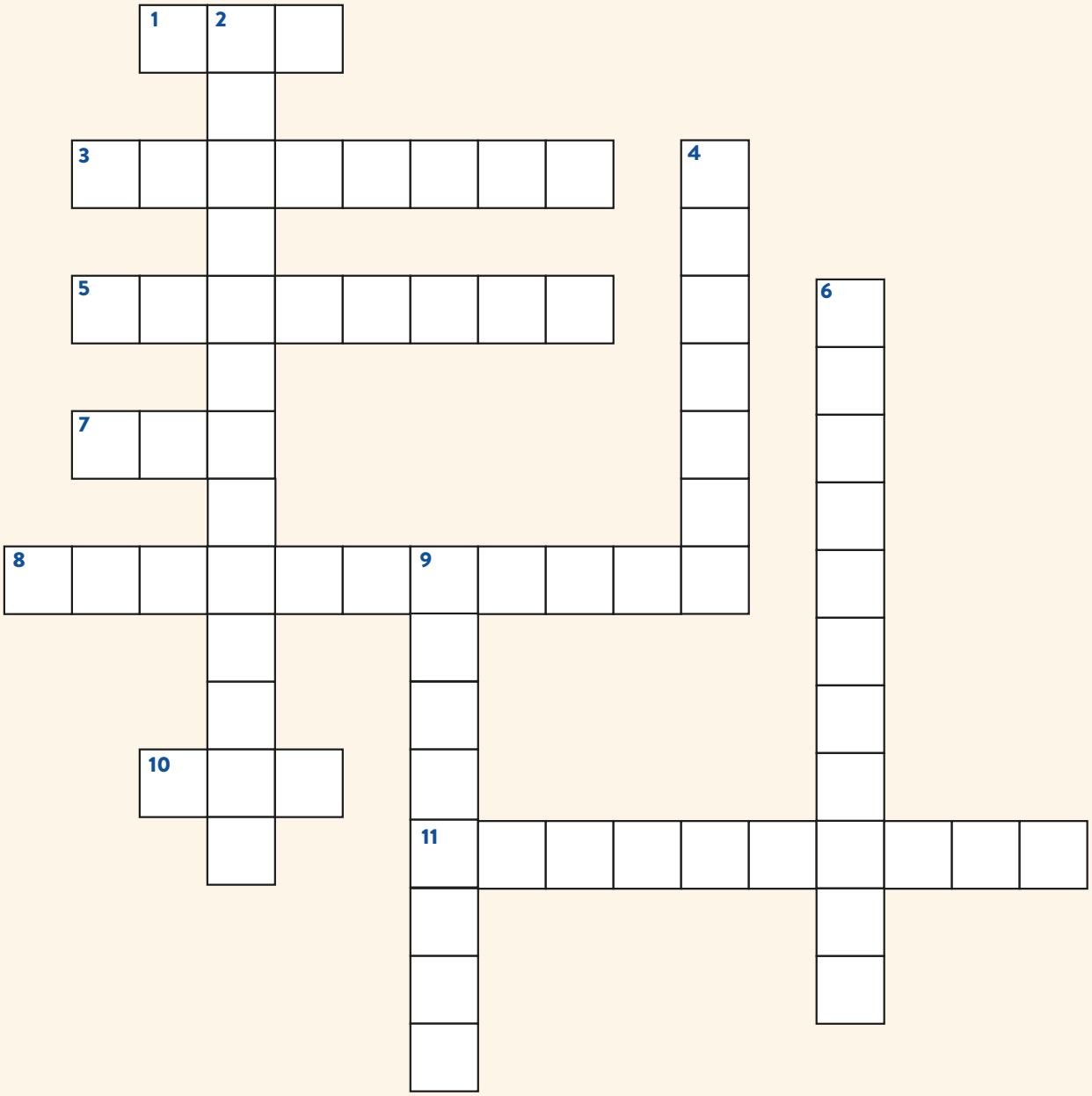
1. **What virtues do you value most in yourself and others? How do they guide your behaviour?**

2. How do you align your values with your actions?

3. What qualities do you think make a great leader? How can leadership skills be developed?

4. How do cultural values impact the way we understand and express our character strengths?

CHARACTER STRENGTHS LEARNING CHECK



DOWN:

2. When we develop a better understanding of our strengths and values it can enhance our own _____.

4. By promoting positive character traits and virtues, the CSV can help create a positive workplace _____. This can lead to a more supportive, respectful and inclusive workplace environment where employees feel valued and respected.

6. The DSM has often been criticised for using this reductionist approach.

9. The DSM-5 organises disorders into categories based on their ____.

ACROSS:

1. This framework is a positive psychology framework developed by Christopher Peterson and Martin Seligman in 2004.

3. The VIA measures what it says it measures. This term is know as having high _____.

5. When the CSV is implemented in the workplace highlighting the strengths of an employee and their colleagues, it is known to improve this.

7. Character strengths and virtues are measured using this tool.

8. The VIA uses this scale to measure the 24 identified strengths.

10. This tool primarily focuses on mental illness and disorders.

11. This virtue encompasses forgiveness.

Describe how the VIA-IS could be used

The Character Strengths and Virtues (CSV) and the Values in Action Inventory of Strengths (VIA) are related yet distinct concepts in positive psychology. The VIA is a psychometric instrument designed to measure the 24 character strengths identified in the CSV. The survey contains a total of 240 questions – 10 items for each of the 24 identified strengths, laid out in a 5-point Likert scale format. Officially known as the Values in Action Inventory of Strengths (VIA-IS), it was developed by Dr. Christopher Peterson and has long been considered a psychometric instrument. It performs well on empirical tests of reliability and validity, which we will consider later in this chapter.

Figure 5.4.3: Example of a Likert scale.

The (VIA-IS) could be used in different contexts such as:

Personal development: By helping individuals gain greater self-awareness and insight into their character strengths. By identifying their top strengths, individuals can focus on developing and using these strengths to improve their overall well-being and lead a more fulfilling life.

Career development: The VIA-IS can be used in career development to help individuals identify their strengths and find roles that align with their strengths. By understanding their strengths, individuals can make more informed decisions about their career paths and develop skills that will help them excel in their chosen field.

Education: Helping students identify their strengths and develop them to achieve their academic goals. By understanding their strengths, students can focus on areas where they excel and develop strategies to overcome challenges in areas where they may struggle.

Leadership development: To help individuals identify and develop their leadership strengths. By understanding their strengths, leaders can lead more effectively, communicate more clearly, and build stronger relationships with their teams.

Team building: Team-building activities to help team members understand each other's strengths and work together more effectively. By leveraging each other's strengths, team members can better collaborate, communicate, and problem-solve together.

Overall, the VIA-IS can be used in a range of contexts to help individuals develop greater self-awareness, identify their strengths, and cultivate them for personal and professional growth and unlock their potential and lead a more fulfilling life.

Figure 5.4.4: Example of an alternative Likert scale.

Investigate the reliability and validity of the VIA-IS

SCIENCE INQUIRY SKILLS

1. **Briefly define the psychological term reliability.**

2. **Briefly define the psychological term validity.**

While the VIA-IS has gained popularity in recent years, it is important to evaluate the reliability and validity of this tool before using it to make any significant decisions or assessments. The reliability of a psychometric tool refers to the consistency of its results over time, while validity refers to the accuracy of the results in measuring what it claims to measure. In the case of the VIA-IS, studies have shown sound levels of both reliability and validity.

Reliability studies of the VIA-IS have found high levels of internal consistency, which means that the items within the test are measuring the same underlying construct. Test-retest reliability studies have also found that the VIA-IS produces consistent results over time.

Validity studies of the VIA-IS have found evidence of construct validity, which means that the VIA-IS is measuring what it claims to measure, which is character strengths. Additionally, studies have found that the VIA-IS has good predictive validity, meaning that an individual's top strengths as measured by the VIA-IS can be used to predict positive outcomes, such as greater well-being, improved relationships, and higher levels of achievement.

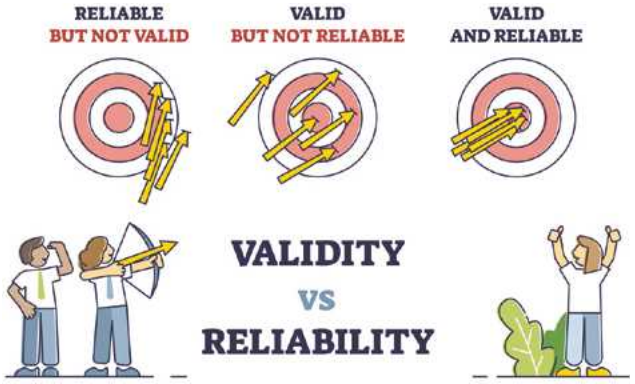


Figure 5.4.5: Demonstrating the difference between Reliability and Validity.

Conversely Littman-Ovadia & Lavy, 2012, argue that test-retest reliability may be less relevant for character strengths, as they are considered relatively stable traits that do not change rapidly over time.

Watch this clip to remind you:
https://tinyurl.com/2p852ykd.

SCIENCE INQUIRY SKILLS

Conduct research to find evidence which supports the claim that the VIA-IS is reliable and or valid. Outline the findings below making sure that the focus is on the reliability and validity.

TEACHING ACTIVITY

Title: "Strengths Selfie"

Objective: To learn about the reliability and validity of the VIA Inventory of Strengths (VIA-IS) through a fun and interactive activity.

Materials:
- VIA-IS website
- Camera or smartphone
- Whiteboard or large sheet of paper
- Markers

Instructions:
Recap on the CSV and VIA.

Divide the class into groups of 4-5 students. Each group should choose a team leader.

Instruct student to go to the VIA-IS website and take the assessment. They should take a screenshot of their results and share it with their group.

Give each group a camera or smartphone and ask them to take a group "Strengths Selfie." In the photo, each member of the group should hold up a piece of paper with their top character strength written on it.

Have each group present their "Strengths Selfie" to the class. They should explain their top strengths and how they plan to use them in their personal and academic lives.

After all groups have presented, lead a class discussion about the reliability and validity of the VIA-IS. Ask students to reflect on their own experience taking the assessment and discuss the following questions:

Student responses:
1. How confident are you in the accuracy of your results?

2. Do you think the VIA-IS is a reliable measure of character strengths? Why or why not?

3. Do you think the VIA-IS is a valid measure of character strengths? Why or why not?

4. Are there any limitations to the VIA-IS that we should be aware of?

5. Consider how your results align with your self-perception and how you plan to use your strengths in the future.

Describe some of the criticisms of the VIA-IS

Whilst the VIA-IS is a highly regarded measurement tool, it is not without criticism. One of the main critiques, as with many other psychological constructs, is the lack of cultural diversity. The VIA-IS was developed based on Western conceptualizations of character strengths and virtues which some researchers have argued may not be applicable or relevant to individuals from other cultures or backgrounds, as the character strengths and virtues may be different or valued differently.

Some researchers have argued that the identification and measurement of 24 character strengths may not be comprehensive enough to capture the full range of positive human traits. Additionally, some individuals may possess strengths that are not included in the VIA-IS, which could limit its usefulness as a measure of character strengths. Conversely, there is concern that the character strengths and virtues may overlap or correlate too strongly with other constructs, such as personality traits. This could lead to a lack of discriminant validity, where it is difficult to differentiate between the constructs being measured.

Peterson and Seligman (2004) provided evidence for the construct validity of the VIA-IS by showing that the character strengths measured by the VIA-IS were positively correlated with life satisfaction, positive affect, and well-being, and negatively correlated with depression and negative affect. Despite the VIA-IS being high in construct validity, research indicates there is limited evidence of predictive validity. Predictive validity refers to the degree to which a measure can predict future outcomes. There have been few studies that have examined the ability of the VIA-IS to predict outcomes such as well-being, academic performance, or job performance, with varying results.

Researchers and practitioners should be aware of these limitations when using the VIA-IS and consider using other measures or complementary approaches to measure character strengths.

A study by Park et al. (2004) found that the VIA-IS consistently exhibits high interal reliability, which is further supported by Peterson et al. (2005) who found that the VIA-IS had good test-retest reliability over a one-week period, with an average correlation of .71.

Like any self-report tool the VIA-IS may be subject to social desirability bias or other forms of response bias. Some individuals may respond in a way that they think is socially desirable rather than accurately reflecting their true character strengths. Therefore, the data may be compromised in making valid conclusions.

Overall, the research suggests that the VIA-IS has good reliability and validity as a measure of character strengths. However, it is important to note that no assessment tool is perfect and there may be limitations to the VIA-IS that future research may uncover.

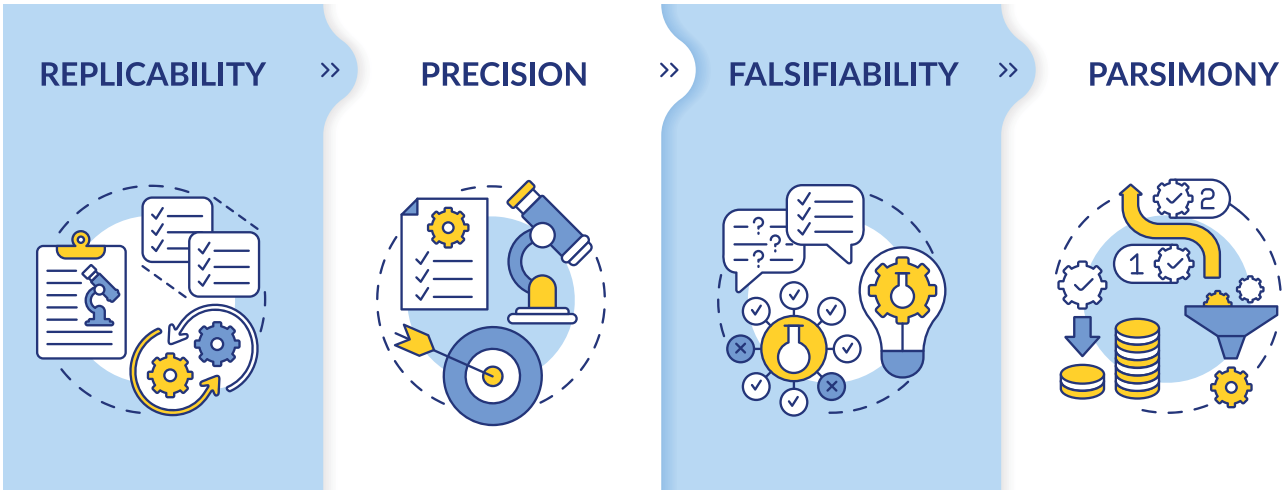


Figure 5.4.7: Demonstrating components of scientific method.

Interventions in positive psychology focus on increasing wellbeing

MINDFULNESS

The origins of mindfulness can be traced back to ancient contemplative traditions, particularly in Buddhist meditation practices. Mindfulness is a core component of Buddhist meditation and is often referred to as "sati" in Pali, the language of the Buddhist scriptures. The term "mindfulness" itself comes from the English translation of the Pali word "sati."

The Buddhist tradition views mindfulness as a way of developing awareness and insight into the nature of reality, including the impermanence and interconnectedness of all things. Mindfulness is seen as a path to liberation from suffering and a means of cultivating compassion and wisdom.

In the 20th century, mindfulness began to be adapted and popularized in the West through the work of scholars and meditation teachers such as Jon Kabat-Zinn, who developed Mindfulness-Based Stress Reduction (MBSR) as a secular, non-religious program for promoting wellbeing. Since then, mindfulness has become an increasingly popular approach to enhancing mental health and wellbeing, and has been adapted for use in a variety of settings, including healthcare, education, and the workplace.

There are many potential benefits of mindfulness, including:

- **Reduced stress and anxiety:** Mindfulness practices have been shown to help reduce symptoms of stress and anxiety, by promoting a sense of calm and relaxation, and helping individuals to better manage their thoughts and emotions.
- **Improved mental health:** Regular mindfulness practice has been associated with a range of positive mental health outcomes, including reduced symptoms of depression, increased feelings of well-being, and improved quality of life.
- **Better focus and concentration:** Mindfulness practices can help improve focus and attention, by training the mind to stay present in the moment and to avoid distractions.

Figure 5.4.8: Being mindful not mind full.

- **Increased self-awareness:** Mindfulness practice can help individuals become more aware of their thoughts, feelings, and physical sensations, allowing them to better understand themselves and their experiences.
- **Improved relationships:** Mindfulness can help individuals develop greater empathy and compassion towards others, which can lead to stronger, more positive relationships.
- **Better physical health:** Research has shown that mindfulness practices can have a range of physical health benefits, including lower blood pressure, improved sleep quality, and reduced inflammation.

Overall, mindfulness can be a powerful tool for enhancing mental and physical health, improving relationships, and cultivating a greater sense of wellbeing and inner peace. However, it is important to note that mindfulness is not a one-size-fits-all solution and may not be effective for everyone. It is also important to approach mindfulness practices with curiosity and openness, and to seek guidance from a qualified teacher or practitioner when needed. A meta-analysis was conducted by a team of researchers led by Dr. Lisa G. Wood at the University of Auckland in New Zealand (2019) found that mindfulness-based interventions were effective in reducing symptoms of anxiety and depression in youth. The study analyzed data from 24 randomized controlled trials involving a total of 2,031 youth between the ages of 6 and 18 years old. The researchers concluded that mindfulness-based interventions showed promise as a treatment option for anxiety and depression in youth and recommended further research in this area.

REAL WORLD CONTEXT

The randomized controlled trial published in the journal Mindfulness in 2018 aimed to investigate the effectiveness of a MBSR program in reducing symptoms of Post Traumatic Stress Disorder (PTSD) in military veterans. The study involved 116 veterans who had been diagnosed with PTSD and were randomly assigned to either an MBSR group or a control group.

The MBSR program consisted of eight weekly 2.5-hour sessions, as well as a full-day retreat, and included mindfulness meditation, yoga, and group discussions. The control group received treatment as usual, which included a range of treatments such as medication, psychotherapy, or a combination of both.

The results of the study showed that the veterans who participated in the MBSR program had significantly greater reductions in symptoms of PTSD compared to those in the control group. Specifically, the MBSR group had lower scores on measures of PTSD symptoms, depression, and anxiety, and reported greater improvements in quality of life.

The study also found that the benefits of the MBSR program were sustained over a 12-month follow-up period, suggesting that mindfulness-based interventions may have lasting effects on mental health outcomes.

Overall, the study provides evidence that mindfulness-based interventions, such as MBSR, may be an effective treatment option for individuals with PTSD, particularly military veterans. Nonetheless, further research is needed to fully understand the mechanisms by which mindfulness exerts its effects in this population and to identify the most effective ways of implementing mindfulness interventions in different contexts.

MINDFULNESS ACTIVITIES

Mindfulness can include a variety of activities and practices, but the most common forms of mindfulness involve bringing focused attention and non-judgmental awareness to the present moment. Some examples of activities that can be used to cultivate mindfulness include:

Mindful breathing: This involves bringing attention to the sensations of breathing, such as the movement of the chest and the feeling of air passing through the nostrils.

Body scan meditation: This involves systematically bringing attention to different parts of the body, from the toes to the top of the head, and observing any sensations that arise.

Mindful movement: This involves bringing attention to the sensations of the body during movement, such as during yoga or walking meditation.

Mindful eating: This involves bringing attention to the sensations of taste, texture, and smell during meals, as well as any thoughts or emotions that arise during the eating process.

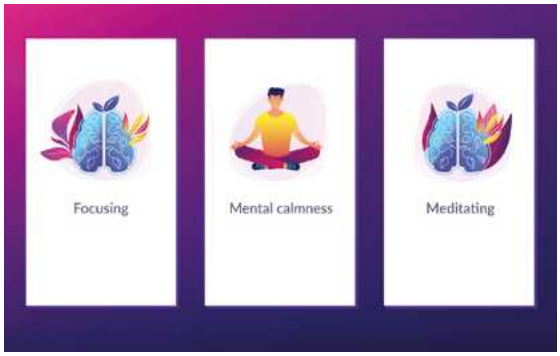
Mindful listening: This involves bringing attention to sounds, such as the sounds of nature, music, or conversations, and observing any thoughts or emotions that arise in response to them.

Overall, mindfulness activities involve training the mind to stay focused on the present moment and to observe thoughts, feelings, and sensations without judgment. Through regular practice, mindfulness can help individuals cultivate a greater sense of calm, clarity, and self-awareness, and can be an effective tool for enhancing mental health and wellbeing.

HELPFUL ONLINE RESOURCES

Apps for Mindfulness:

- Calm
- Smiling Mind
- Insight Timer



HELPFUL ONLINE RESOURCES

Scroll down to approximately halfway through this content for some great guided mindfulness videos:
https://tinyurl.com/2jmh4395

Reflection:

1. **How do you feel after engaging in the guided meditation?**

2. **How could daily engagement in mindfulness make a change in your life?**

GRATITUDE

The practice of gratitude involves deliberately focusing on and appreciating the good things in one's life and is therefore closely linked to mindfulness. It involves recognizing and acknowledging the positive experiences, people, and things that we have, and feeling a sense of thankfulness and appreciation for them.

Gratitude can be practiced in many ways, including through journaling, meditation, or simply taking time each day to reflect on the things we are grateful for. For example, one might start or end each day by writing down three things they are grateful for, or by mentally noting moments throughout the day that brought them joy or made them feel thankful. Research has shown that practicing gratitude can have a range of benefits for mental health and wellbeing. It has been linked to lower levels of stress and depression, greater feelings of happiness and life satisfaction, and improved relationships and social connections.

STUDENT ACTIVITY

THINK-PAIR-SHARE

Note 3 things that you are grateful for.

1.

2.

3.

Share this with someone on your table. For each thing that you are grateful for take a moment to reflect on why you are grateful for it. What positive impact has it had on your life?

How does it make you feel?

HELPFUL ONLINE RESOURCES

Three good things
https://tinyurl.com/etrdstmc

The "Three Good Things" exercise is a simple gratitude practice that can help individuals cultivate a more positive outlook on life. The exercise involves reflecting on three good things that happened during the day and considering why they happened.

To practice the Three Good Things exercise, one can follow these steps:

Figure 5.4.9: Benefits of Gratitude.

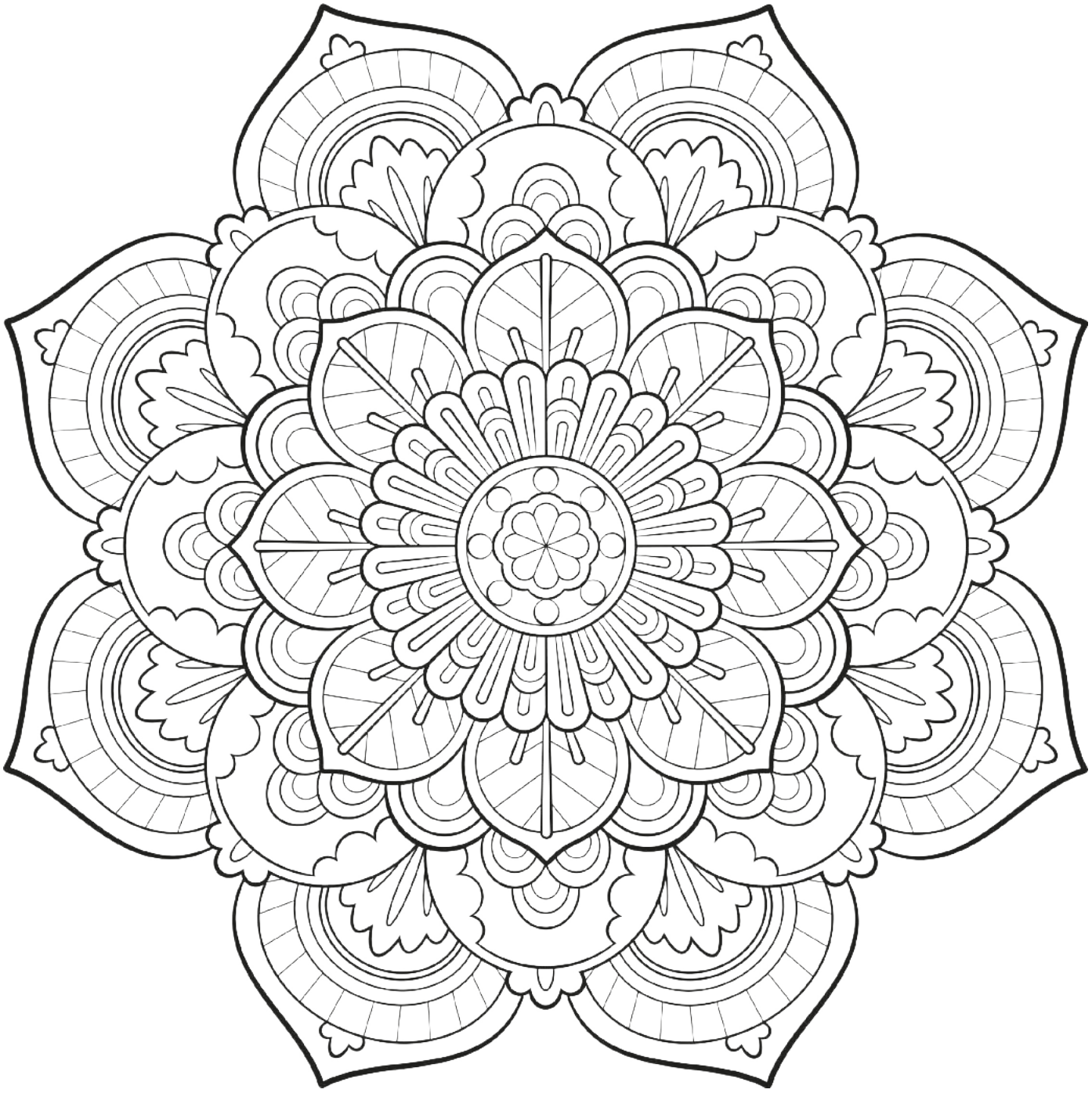
Set aside some time each day to reflect on three good things that happened during the day. These can be big or small and can include anything that brought a sense of joy, gratitude, or positivity.

For each of the three good things, take a moment to consider why they happened. What factors contributed to these positive experiences? What actions or qualities of yourself or others led to these good things?

Take a moment to savour the positive feelings associated with these good things. Allow yourself to fully experience the joy, gratitude, or other positive emotions that arise.

Research has shown that practicing the Three Good Things exercise can help to increase feelings of happiness and life satisfaction, reduce symptoms of depression and anxiety, and improve overall wellbeing. By intentionally focusing on the positive aspects of our lives, we can shift our attention away from negative experiences and emotions and cultivate a greater sense of optimism and resilience in the face of challenges.

Try some mindfulness colouring.



MEDITATION AS A PSYCHOLOGICAL INTERVENTION

Meditation is a mind-body practice that involves training the mind to focus and calm the mental chatter. The origins of meditation can be traced back to ancient Eastern religions, specifically in Hinduism and Buddhism. The practice of meditation was originally developed as a means of spiritual development, aimed at achieving a deeper understanding of the self and the universe.

There are several different types of meditation practices, including mindfulness meditation, transcendental meditation, loving-kindness meditation, body scan meditation, chakra meditation, and yoga meditation. Each type of meditation practice involves a unique set of techniques and goals, but they all share the common goal of quieting the mind and achieving a state of inner peace and calm.

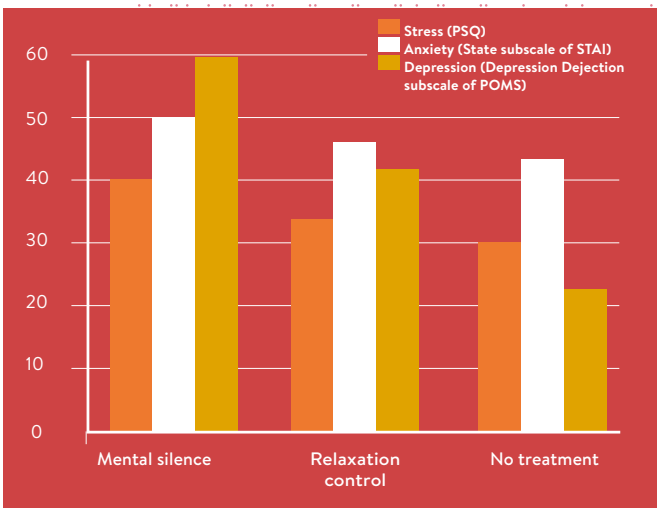
Some of the most commonly reported benefits of meditation include reduced stress, anxiety, and depression, improved sleep, lower blood pressure, improved cognitive function, and increased self-awareness and mindfulness.

SCIENCE INQUIRY SKILLS

Research regarding the benefits of meditation was conducted by Creswell (2015) of the University of Berkely, California and was published in the Journal of Personality and Social Psychology.

1. Complete an online search to find more information on this research. Provide an overview of the methodology and results in the space below.

2. Write a conclusion for the following data.



HELPFUL ONLINE RESOURCES

'WTF is Mindfulness Meditation'.
https://tinyurl.com/aja3n74k

According to the Mayo Clinic (2023), mediation has the following physical and psychological benefits:

- Gaining a new perspective on stressful situations
- Building skills to manage your stress
- Increasing self-awareness
- Focusing on the present
- Reducing negative emotions
- Increasing imagination and creativity
- Increasing patience and tolerance
- Lowering resting heart rate
- Lowering resting blood pressure
- Improving sleep quality

Other than mindfulness meditation, the most common types of meditation include:

Transcendental meditation: This is a form of mantra meditation that involves repeating a specific sound or phrase (known as a mantra) in order to focus the mind and achieve a state of deep relaxation.

Loving-kindness meditation: Also known as metta meditation, this practice involves cultivating feelings of love, kindness, and compassion towards oneself and others. It typically involves silently repeating phrases such as "may I be happy, may I be healthy, may I be safe and at peace."

Yoga meditation: This form of meditation involves practicing yoga postures and breathing exercises (known as pranayama) to cultivate a sense of physical and mental balance and relaxation.

Zazen meditation: This is a form of meditation commonly practiced in Zen Buddhism. It involves sitting in a specific posture (known as the lotus or half-lotus position) and focusing on the breath or an object of meditation.

Chakra meditation: This is a form of meditation that focuses on the body's energy centres, or chakras. It typically involves visualizing each chakra and chanting a specific sound associated with that chakra.

These are just a few examples of the many different types of meditation that are practiced around the world. Each type of meditation has its own unique benefits and may be more suited to certain individuals based on their needs and preferences.

In conclusion, meditation is a powerful tool for cultivating inner peace and calm, improving mental and physical health outcomes, and increasing self-awareness and mindfulness. By incorporating a regular meditation practice into your daily routine, you can experience the many benefits of this ancient and powerful practice.

Figure 5.4.10: Illustrating Zazen meditation.

CRITICAL ANALYSIS OF MINDFULNESS AND MEDITATION AS PSYCHOLOGICAL INTERVENTIONS

While meditation and mindfulness have been shown to have numerous potential benefits for mental health and wellbeing, there has been some critical analysis regarding the effectiveness of meditation as a psychological intervention. Here are a few examples:

The placebo effect: Some researchers have argued that the benefits of meditation may be partly or entirely due to a placebo effect. The placebo effect is a phenomenon in which a person experiences a beneficial effect after receiving an inactive treatment, simply because they believe that the treatment will help them. In the case of meditation, some researchers have suggested that the benefits of the practice may be partly or entirely due to a placebo effect.

Figure 5.4.11: Inferring the Placebo effect.

For example, if people are told that meditation can help reduce stress and anxiety, they may feel more relaxed and less anxious simply because they expect the practice to have that effect. This could be due to psychological factors such as expectancy, attention, and conditioning.

It is important to note that the placebo effect is not necessarily a bad thing, and it can play an important role in the effectiveness of many medical and psychological treatments. However, it is also important to distinguish between the specific effects of a treatment and any placebo effects that may be influencing the results. This can be challenging in the case of meditation, as the practice may have multiple potential mechanisms of action and effects on the mind and body.

Lack of standardized approach: There is a lack of standardized approach to meditation, which can make it difficult to compare results across studies or to draw firm conclusions about the most effective types of meditation or techniques.

Lack of scientific rigor: Some studies of meditation have been criticized for having methodological flaws or lacking scientific rigor. For example, some studies have had small sample sizes, inadequate control groups, or have not been double-blinded (meaning that both the researchers and participants know which group is receiving the intervention).

Potential for harm: Although meditation is generally considered safe for most people, there have been reports of negative effects such as anxiety, depression, or even psychosis in some individuals. It is important for practitioners to be aware of potential risks and to practice under the guidance of a qualified teacher.

It is worth noting, however, that many of these criticisms apply to specific studies or types of meditation, and that overall, the research on the benefits of meditation is largely positive. Further research is needed to fully understand the mechanisms by which meditation may work and to identify the most effective ways to incorporate it into mental health treatment.

While there is some critical analysis and debate about the effectiveness of meditation as a psychological intervention, most of the research suggests that meditation can have positive effects on mental health and wellbeing.

For example, a 2014 meta-analysis conducted by researcher at John Hopkins University

School of Meditation, 47 studies found that mindfulness meditation programs had a small but significant effect on reducing symptoms of anxiety, depression, and stress. Another meta-analysis published in 2017 found that meditation-based interventions were effective in reducing symptoms of anxiety, depression, and pain in a variety of populations.

Figure 5.4.12: Illustrating the concept of Mindfulness.

However, as with any intervention, there are individual differences in response and some people may not experience benefits from meditation. Additionally, some studies have been criticized for methodological limitations or a lack of standardization in the approach to meditation.

Overall, the research on meditation as a wellbeing intervention is generally positive, and many mental health professionals and organisations recommend meditation as a tool for reducing stress and improving overall health and wellbeing. However, more research is needed to fully understand the mechanisms of action and the most effective approaches to meditation for different populations and contexts.

CHECKING FOR UNDERSTANDING

Mindfulness is a _____ intervention that involves bringing one's attention to the _____ moment and accepting it without judgment. It is often practiced through meditation, which can help to reduce stress, _____, and depression.

The practice can be traced back to ancient _____ traditions but has gained popularity in Western culture as a tool for improving mental health and wellbeing.

_____ practice that involves reflecting on three positive experiences each day. This can help to increase feelings of happiness and well-being.

While there is some debate about the _____ of meditation as a psychological intervention,

the majority of research suggests that it can have _____ effects on mental health and wellbeing. However, individual differences in response and methodological limitations in some studies suggest that more research is needed to fully understand the mechanisms of action and the most effective approaches to meditation for different_____ and contexts.

Some researchers have argued that the benefits of meditation may be partly or entirely due to a _____ effect.

Myth buster quiz: Highlight your answer to the following:

True or false: Meditation can only be practiced by people who are highly spiritual or religious.
True or false: Mindfulness is just another word for meditation.
True or false: Meditation is a waste of time because it doesn't produce tangible results.
True or false: Mindfulness is only useful for reducing stress and anxiety.
True or false: Meditation always involves sitting in silence for long periods of time.

See answers on Page 231

Cognitive Behavioural Therapy (CBT)

Figure 5.4.13: Don't believe everything you think reference to CBT.

Cognitive Behavioural Therapy (CBT) is a form of talk therapy that focuses on the connection between thoughts, feelings, and behaviours. CBT is based on the idea that our thoughts and beliefs about ourselves, others, and the world around us can affect how we feel and behave. By changing our thoughts and behaviours, we can change the way we feel.

CBT is a goal-oriented therapy that focuses on specific issues and problems. It is a structured approach that involves working collaboratively with a therapist to identify negative thought patterns and behaviours, challenging them and replacing them with more positive and constructive ones.

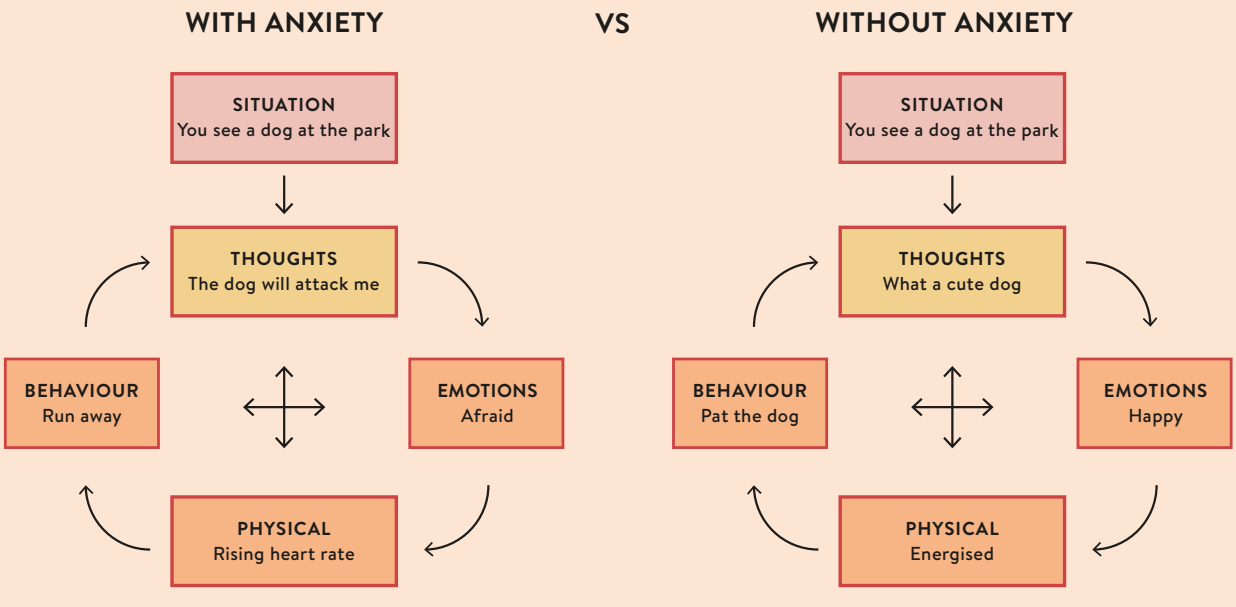


Figure 5.4.14: Appraisal with and without anxiety.

HELPFUL ONLINE RESOURCES

Watch this YouTube video by the Beck Institute for Cognitive Behaviour Therapy:
https://tinyurl.com/487bsthb

Throughout the treatment, the therapist and client work together to identify negative thoughts and beliefs that are causing or contributing to the client's problems. The client is then taught specific techniques to challenge and change these thoughts and beliefs. These techniques may include cognitive restructuring, behavioural experiments, and exposure therapy. It is typically a short-term therapy, with most treatment plans lasting between 12-20 sessions. However, the length of treatment can vary depending on the individual and the severity of their symptoms.

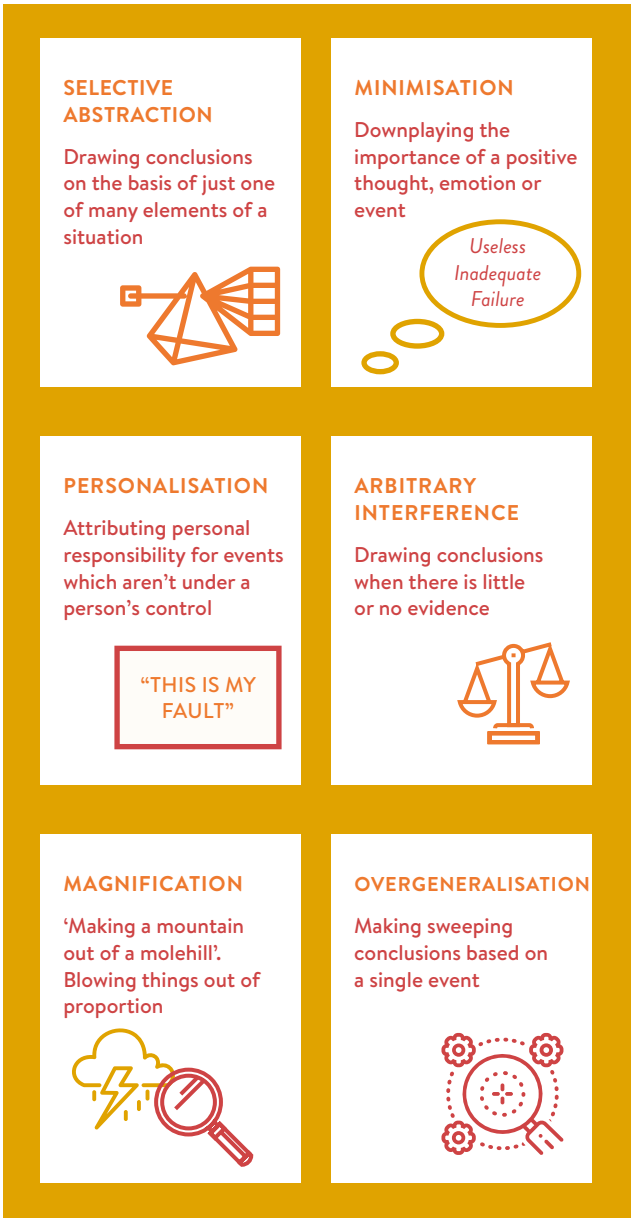


Figure 5.4.15: Components of the maladaptive cognitive bias.

Most often used during 1 to 1 sessions, the therapy can be tailored to meet the unique needs and goals of each individual. It can be used to treat a wide range of mental health conditions, including anxiety, depression, post-traumatic stress disorder (PTSD), and obsessive-compulsive disorder (OCD), among others.

Advantages and disadvantages of CBT as psychological intervention have been widely documented since its introduction as a psychological treatment. One of the key advantages is that CBT is a well-researched intervention that has been shown to be effective for various mental health problems, therefore, there is strong scientific evidence regarding the effectiveness of its use for treating mental illness. Other advantages include:

- **Short-term**: CBT is typically a short-term treatment, usually lasting around 12-20 sessions. This makes it a relatively quick intervention, especially compared to other forms of psychotherapy.
- **Collaborative**: CBT is a collaborative approach that involves the therapist and client working together to develop strategies to manage and overcome problems.
- **Focused**: CBT is a focused therapy that is tailored to the individual's specific problems and concerns.
- **Skills-based**: CBT provides clients with specific skills and techniques to manage their thoughts, emotions, and behaviours.

One of the most referenced disadvantages of CBT throughout the research suggests that CBT may not be suitable nor effective for everyone, especially those who have more complex mental health problems or who require a more intensive treatment approach. CBT requires the individual to have the capacity for reflection and insight and therefore, some individuals with intellectual disabilities and young children would be unsuitable for this form of treatment. Other disadvantages include:

- **Requires active participation**: CBT requires active participation from the client, which may be difficult for those who are not motivated or who have difficulty engaging in the therapeutic process.
- **Can be challenging**: CBT can be challenging, especially in the early stages, as clients may have to confront and challenge their negative beliefs and assumptions.
- **Relies on self-report**: CBT relies on self-report from the client, which may be biased or inaccurate.
- **Can be expensive**: CBT can be expensive, especially if clients are required to pay for the sessions out of pocket.

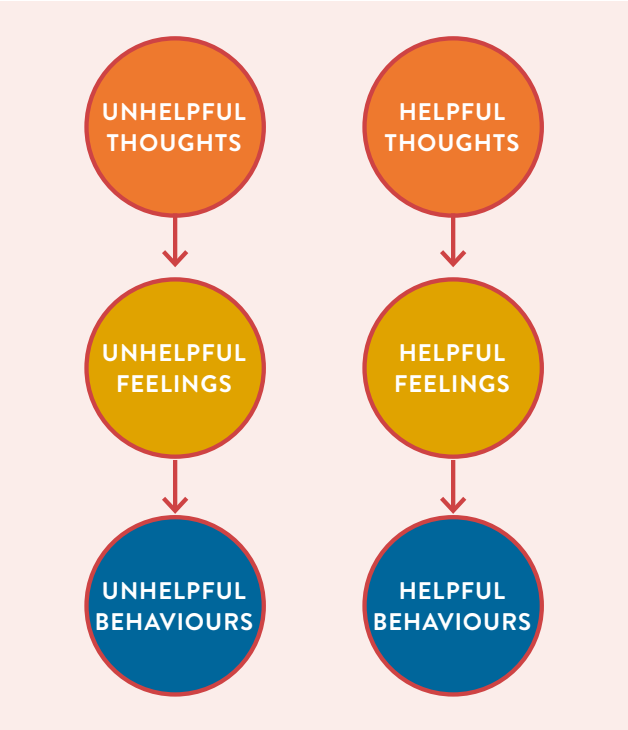


Figure 5.4.16: Challenging maladaptive thinking.

Have a look at the following scenarios and identify the cognitive and behaviour components.

CBT BASED SCENARIOS

Instructions: Highlight the cognitive components one colour and the behavioural components in an alternative colour. Share and compare with someone beside you.

1. Sarah is a college student who is struggling with procrastination. She often puts off studying until the last minute and then feels anxious and stressed about not having enough time to complete her assignments. What cognitive and behavioural aspects might be involved in her procrastination, and how could CBT help her address this issue?

2. John is a high school student who has been experiencing symptoms of social anxiety. He avoids social situations because he is afraid of being judged or rejected by his peers.

CBT
COGNITIVE BEHAVIORAL THERAPY

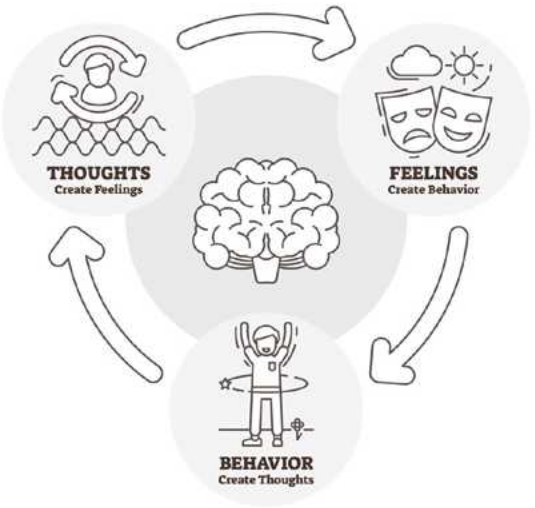


Figure 5.4.17: CBT cycle.

What cognitive and behavioural aspects might be involved in his social anxiety, and how could CBT help him overcome his fear?

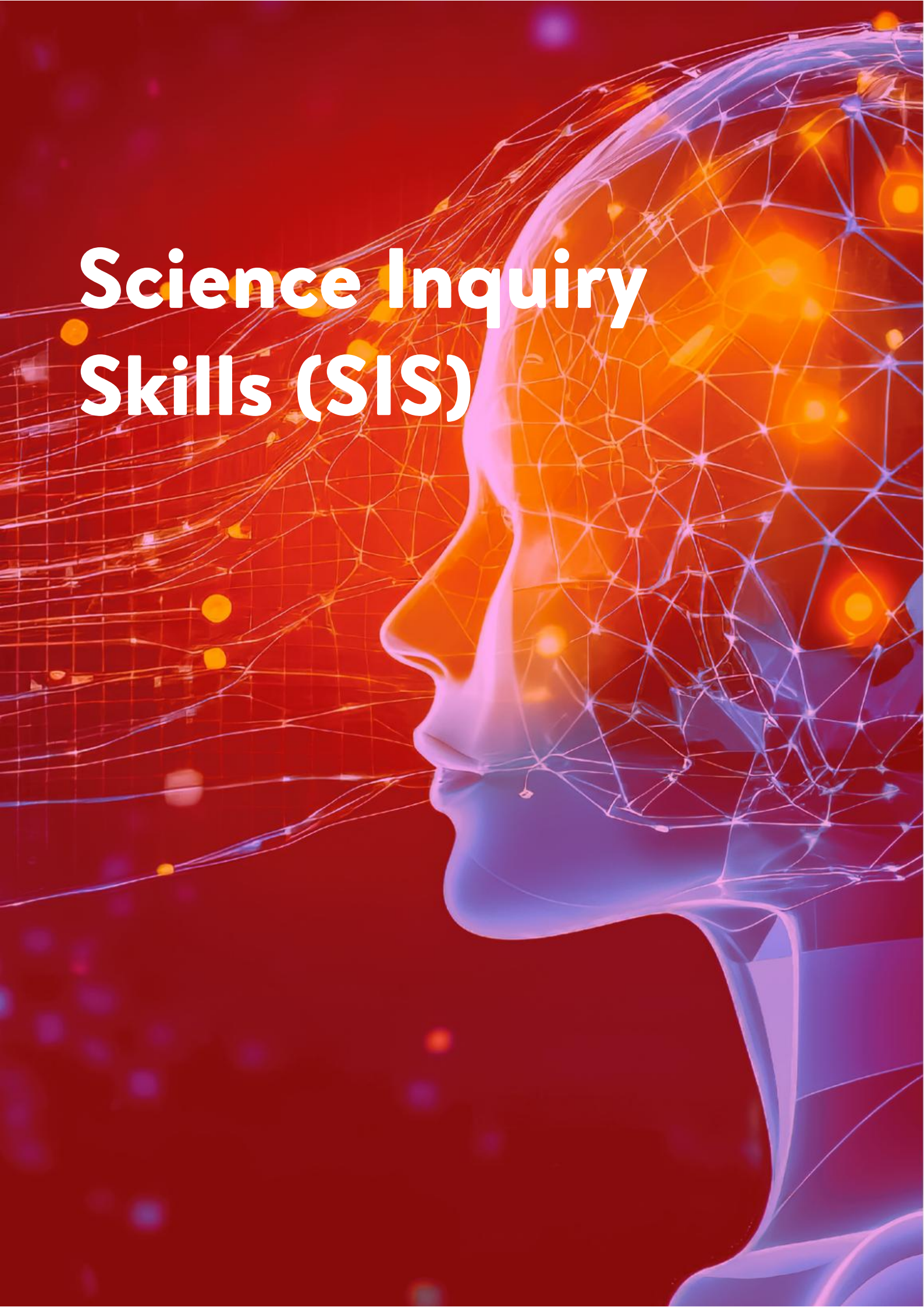
3. Emily is a middle school student who has recently moved to a new city and is having trouble making friends. She feels sad and lonely and often thinks that nobody likes her. What cognitive and behavioural aspects might be involved in her feelings of loneliness and low self-esteem, and how could CBT help her improve her mood and social interactions?

4. Jack is an elementary school student who has difficulty paying attention in class and completing his homework. He often gets distracted by his surroundings and forgets what he was supposed to be doing. What cognitive and behavioural aspects might be involved in his difficulties with attention and focus, and how could CBT help him develop better study habits and concentration skills?

Task 2: Identify solutions using that principles of CBT that will help in each scenario.

	COGNITIVE STRATEGY	BEHAVIOURAL STRATEGY
Sarah		
John		
Emily		
Jack		

Science Inquiry Skills (SIS)



SIS 1 BIOPSYCHOSOCIAL APPROACH

Psychology uses a biopsychosocial approach to frame an understanding of behaviour — that is, behaviour is analysed and described in terms of biological, psychological, and sociocultural factors.

- Explain how biological, psychological, and social factors could determine the cause and expression of certain psychological phenomena.
- Explain how biological, psychological, and sociocultural factors could influence solutions to problematic psychological phenomena.

2023 Subject Outline | Stage 1

The Biopsychosocial model was developed by George L. Engel, who stated that psychological health and disease are caused by the complex interaction of biological, psychological and socio-cultural factors. The **Biopsychosocial approach** proposes that one approach alone is not sufficient to fully explain the complexity of human behaviour and psychological phenomenon, with each contributing interactive forces or systems that affect health.

Biological factors refer to the physical aspects of the body that can influence psychological phenomena. These factors include genetic predispositions, brain structure and function, and hormonal influences. For example, genetic factors play a role in determining the likelihood of developing certain psychological disorders, such as depression or schizophrenia. Additionally, brain structure and function including the balance of neurotransmitters in the brain can affect mood, behaviour and cognition.

Psychological factors involve mental and emotional processes that can shape psychological phenomena. These factors include cognitive processes, emotions, personality traits, and learned behaviours. For instance, cognitive processes such as perception, memory and attention, can impact on individual interpretations and response to their environment. Emotions, such as fear or joy, can influence behaviour and decision making. Personality traits, such as extraversion or neuroticism, can affect an individual thoughts, feelings, and actions. Learning behaviours, acquired through experiences and social conditioning, can also shape psychological phenomenon, such as habits, attitudes, and coping mechanisms.

Social factors encompass the social environment in which an individual lives, including their interactions with others, cultural norms, societal expectations, and social support networks. These factors can have a profound impact on psychological phenomenon. For example, social interactions, such as relationships with family, friends, and peers, can influence an individual's sense of identity, self-esteem, and wellbeing. Cultural norms and societal expectations can shape an individual beliefs, values, and behaviours, influencing psychological phenomena such as attitudes towards body image, gender roles, or social anxiety. Social support networks, including access to social support systems, can play a crucial role in mental health outcomes, such as depression, anxiety, and stress.

Overall, the causes and expression of psychological phenomena are complex and multi factorial, involving a dynamic interplay of biological, psychological, and social factors. Understanding how these factors interact and influence each other can provide a more comprehensive understanding of human behaviour and mental processes. It highlights the importance of adopting a holistic and interdisciplinary approach in the field of psychology to better understand and address psychological phenomena in individuals and communities.

Figure 6.1.1: Components of the BPS Model.

Let's consider an example scenario that demonstrates a complex interaction of the biological, psychological, and social (BPS) model in explaining a psychological phenomenon.

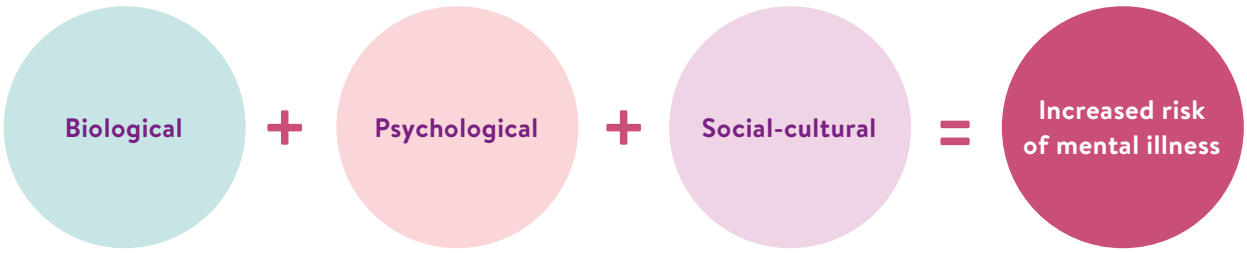


Figure 6.1.2: The complex interaction of BPS factors.

Scenario: The relationship between Depression and Sleep.

Biological factors can influence the development and expression of depression and sleep disturbances. For example, research suggests that imbalances in neurotransmitters, such as serotonin and norepinephrine, which are involved in regulating mood and sleep, can contribute to depression. Additionally, genetic factors may increase the risk of both depression and sleep disorders, as they can be passed down from one generation to another, affecting an individual's vulnerability to these conditions.

Psychological factors play a significant role in the relationship between depression and sleep. For instance, individuals with a history of depression may have negative thought patterns and cognitive biases that affect their perception of sleep quality, leading to increased rumination and worry about sleep. These cognitive processes can further contribute to the development and maintenance of depression. Additionally, emotional factors such as stress, anxiety, and trauma can impact both sleep quality and mood, with sleep disturbances potentially exacerbating depressive symptoms, and vice versa.

Social factors can also impact the relationship between depression and sleep. For instance, social stressors, such as interpersonal conflicts, financial difficulties, or social isolation, can contribute to both depression and sleep disturbances. Social support, on the other hand, can act as a protective factor against depression and sleep problems, as having a strong support system can help individuals cope better with stress and manage their emotions, which can in turn positively influence sleep and mood.

The interaction of biological, psychological, and social factors can create a complex interplay in the relationship between depression and sleep. For example, an individual with a genetic predisposition to depression may experience a sleep disturbance due to an imbalance in neurotransmitters which in turn may trigger depressive symptoms. This can lead to negative thought patterns and cognitive biases, further impacting their perception of sleep quality and contributing to the maintenance of depression. Social factors, such as high levels of stress at work or strained relationships, may exacerbate both the depression and sleep disturbances. On the other hand, a supportive social environment, healthy coping mechanisms, and effective treatment targeting biological and psychological factors may help alleviate both depression and sleep problems.

In summary, this scenario illustrates how the complex interaction of biological, psychological, and social factors can determine the cause and expression of a psychological phenomenon, such as the relationship between depression and sleep. It emphasizes the importance of considering multiple factors and taking a holistic approach in understanding and addressing psychological phenomena, as interventions may need to target multiple levels of the BPS model for effective treatment and management.

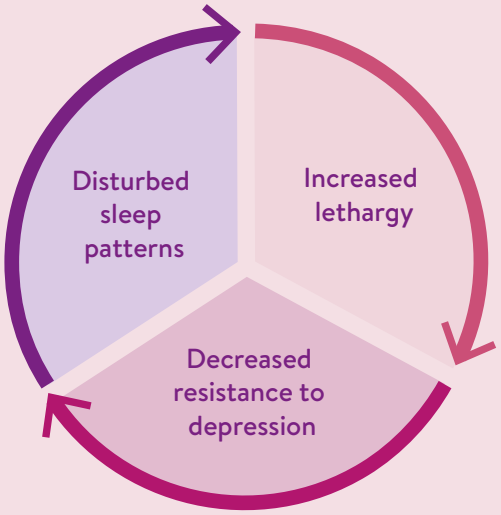


Figure 6.1.3: Relationship between sleep and depression.

HELPFUL ONLINE RESOURCES

Watch the following video explaining Emotions using the BPS model.
https://tinyurl.com/5958kxt8

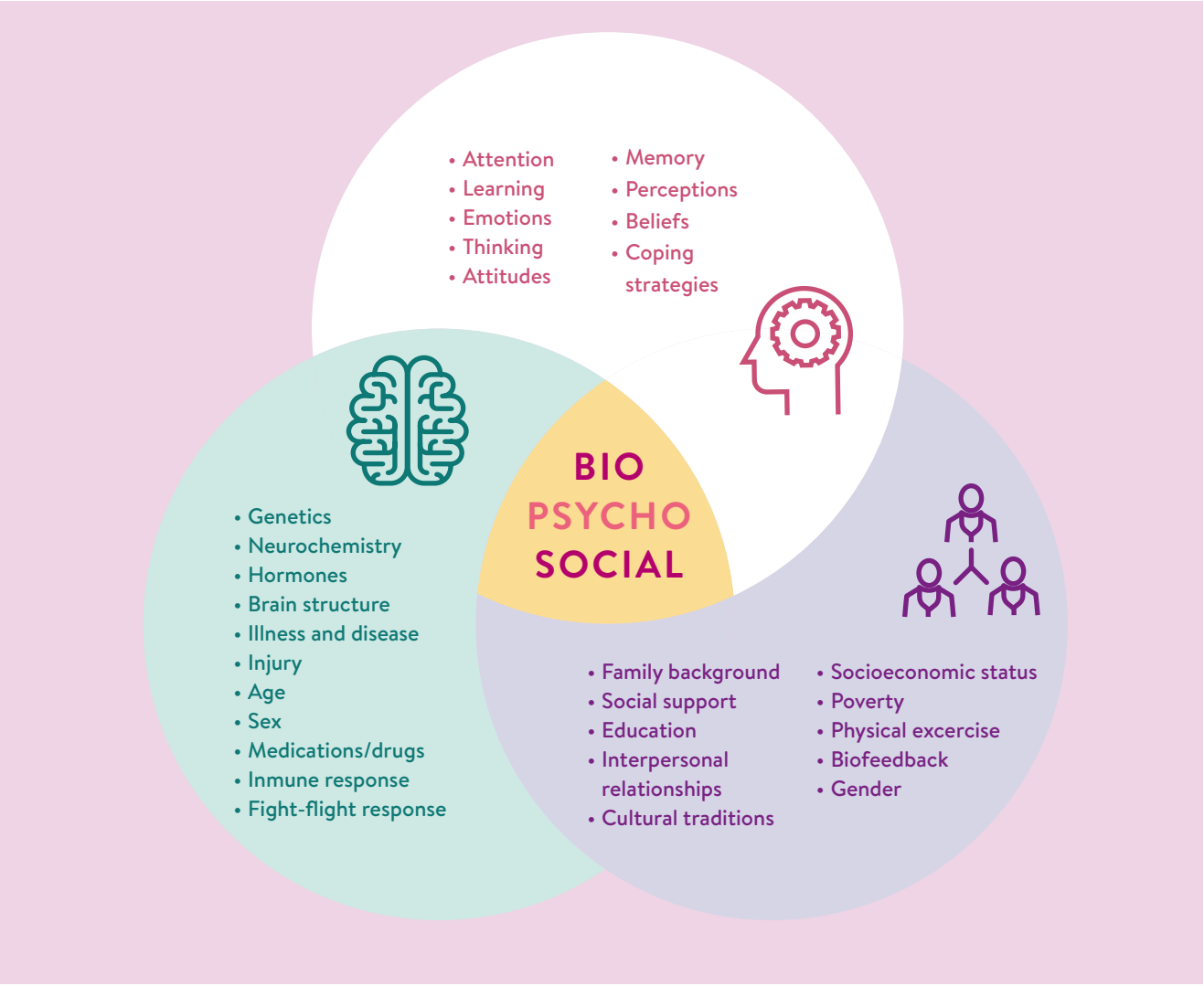


Figure 6.1.4: Biopsychosocial Model of factors contributing to illness.

CHECKING FOR UNDERSTANDING

Using the BPS model, discuss a range of potential factors that could explain anger management challenges in a young person. Consider how the factors interact with one another to explain the manifestation of the disorder.

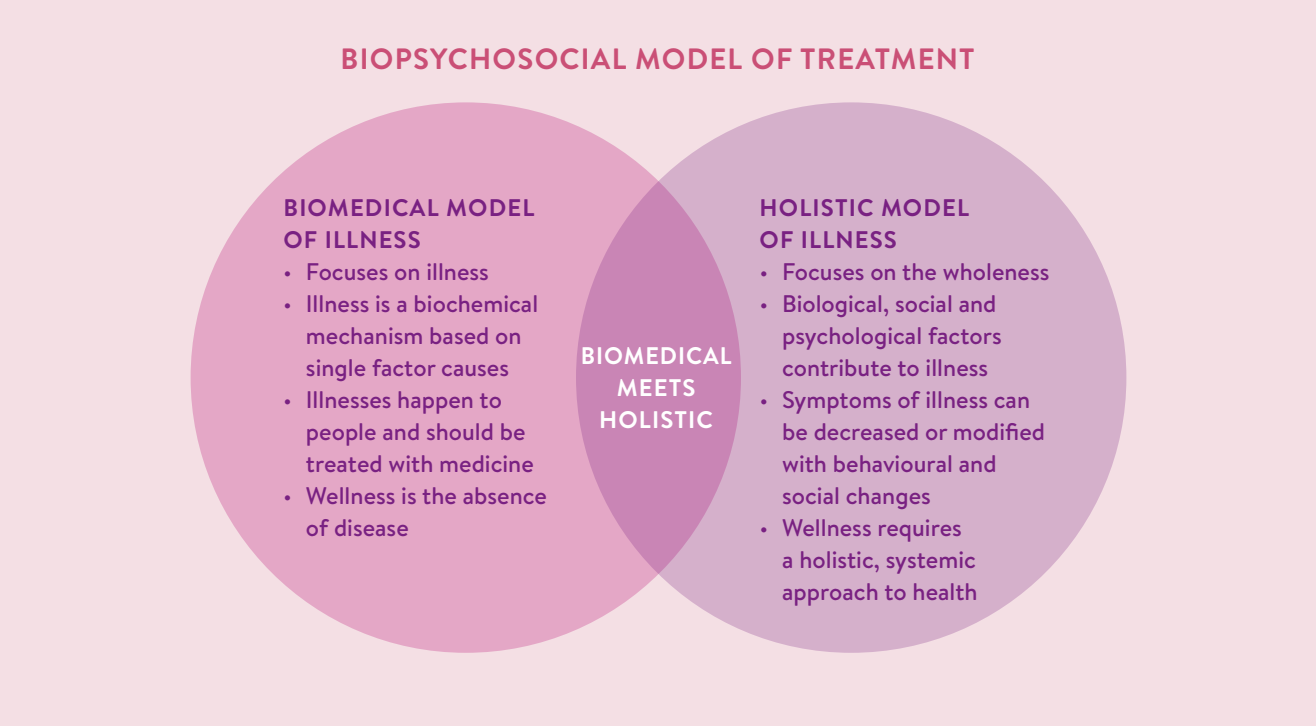


Figure 6.1.5: Holistic treatment utilising BPS model.

Health psychologists believe that all three components must be synthesised to enhance empirical research for mental health education, health policy and identifying barriers to accessing services. The Biopsychosocial model provides an opportunity to explore an integrative approach to enhance mental wellbeing whilst providing opportunity for exploration to find solutions to problematic psychological phenomenon such as addiction, depression, psychosis and eating disorders.

The Biopsychosocial model provides a holistic approach to understanding the complexity of psychological phenomenon and prevalence. This enables practitioners and researchers alike to consider how this information can be used to develop treatments, implement service provisions and interventions whilst identifying gaps in these provisions and further areas for psychological research.

Biological, psychological, and sociocultural factors can all play a significant role in influencing solutions to problematic psychological phenomena. These factors interact in complex ways, shaping the development and expression of psychological issues, and also influencing the most effective strategies for addressing them.

Biological factors involve the physical and genetic aspects of an individual's biology that can influence their psychological well-being. For example, certain genetic predispositions or imbalances in neurotransmitters, which are chemicals that transmit signals in the brain, can contribute to the emergence of psychological problems. Biological factors can also impact an individual's response to treatment, such as the effectiveness of medication in managing symptoms. Understanding the biological factors underlying a psychological phenomenon can guide interventions that target these specific physiological mechanisms, such as medication or other medical interventions.

Psychological factors encompass the cognitive, emotional, and behavioural aspects of an individual's mental and emotional state. These factors can influence how an individual perceives, interprets, and responds to problematic psychological phenomena. For instance, cognitive biases, maladaptive thought patterns, and emotional regulation difficulties can contribute to the development and maintenance of psychological issues. Addressing these psychological factors may involve various therapeutic approaches, such as cognitive-behavioral therapy, mindfulness-based interventions, or other psychotherapeutic techniques that target the individual's thoughts, emotions, and behaviors.

Sociocultural factors encompass the social and cultural context in which an individual lives, including their environment, upbringing, and societal norms. These factors can shape an individual's beliefs, values, and behaviors, and also influence the emergence and expression of psychological problems. For example, cultural expectations, social support networks, and societal stigmas related to mental health can impact an individual's willingness to seek help or disclose their psychological difficulties. Addressing sociocultural factors may involve interventions that take into account the cultural and social context of the individual, such as culturally-sensitive therapy, family therapy, or community-based interventions.

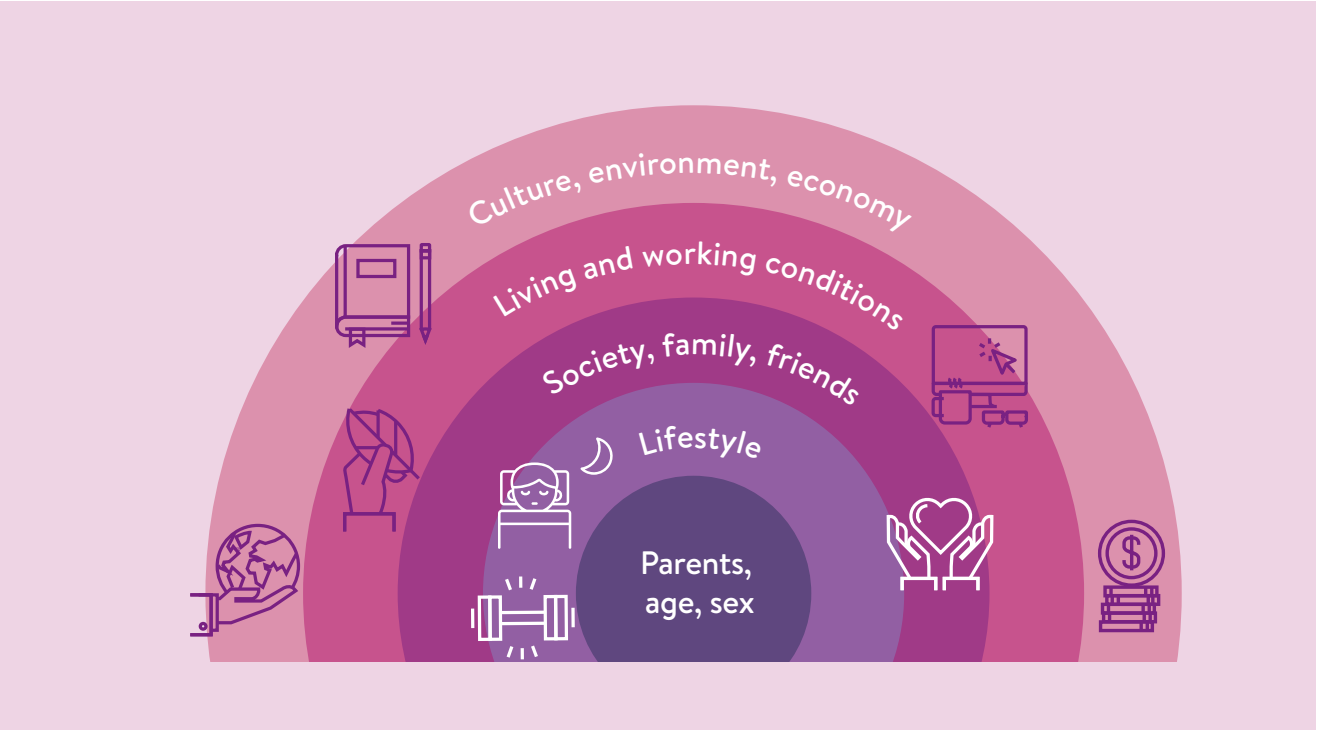
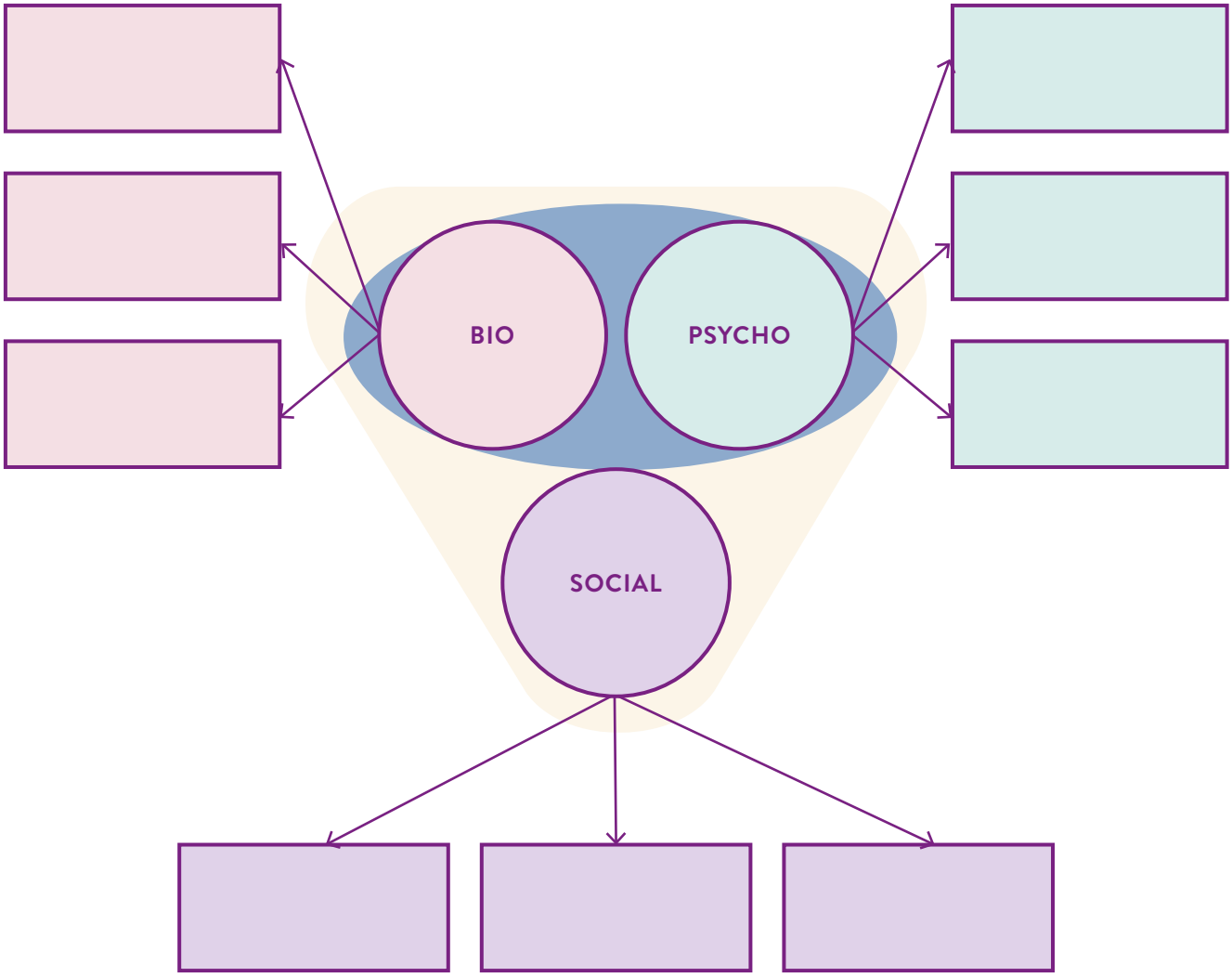


Figure 6.1.6: BPS factors.

In addressing problematic psychological phenomena, it is crucial to consider the interactions and influences of biological, psychological, and sociocultural factors. An integrated approach that takes into account the complex interplay of these factors can lead to more effective and holistic solutions. For instance, a comprehensive treatment plan may involve a combination of medication to address biological factors, therapy to address psychological factors, and interventions that consider the sociocultural context of the individual. Collaborative efforts among healthcare professionals from different disciplines may also be necessary to provide well-rounded care that addresses the multidimensionality of personality issues. Acknowledging the interplay of these factors and taking a holistic approach can guide interventions that consider the unique needs and circumstances of individuals leading to more comprehensive and tailored treatment strategies.

BRAIN STORM

Using the BPS model, identify and explore a range of potential factors that could contribute to the development of a treatment plan for a young person with anger management challenges. Consider how the factors interact with one another to explain the manifestation of the disorder.



Teachers: This could be used as an extended response question.

SIS 2 SCIENTIFIC METHODS

Scientific methods enable systematic investigation to obtain measurable evidence.

- Deconstruct a problem to determine and justify the most appropriate method for investigation.
- Design investigations, including:
  - a hypothesis or inquiry question
  - types of variables
    - dependent
    - independent
    - constant
    - extraneous
  - the method to be followed
  - justification of the method
  - the type and amount of data to be collected
  - identification of ethical considerations and how these may be addressed.
  - identification of socio-cultural considerations and how these may be addressed
- Using information from a range of sources, critically evaluate and appropriately acknowledge those sources.

2023 Subject Outline | Stage 1

The scientific method refers to a systematic approach used by scientists to investigate, understand, and explain phenomena in the natural world. It involves a series of steps that are followed in a logical and organized manner to gather empirical evidence, analyze data, and draw conclusions based on objective observations and rigorous empirical testing.

The basic steps of the scientific method typically include:

Observation: Making observations or noticing a phenomenon in the natural world.

Formulating a question or hypothesis: Identifying a specific question or hypothesis to investigate based on the observation.

Designing and conducting experiments or studies: Planning and conducting experiments or studies to collect data and gather evidence related to the question or hypothesis.

Analysing data: Analysing and interpreting the collected data using statistical methods and other analytical tools to identify patterns, trends, or relationships.

Drawing conclusions: Drawing conclusions based on the analysis of the data and evaluating whether the results support or refute the initial hypothesis.

Communicating findings: Communicating the findings of the study through scientific reports, peer-reviewed journals, presentations, or other means to share the results with the scientific community and the public.

The scientific method relies on evidence-based reasoning, critical thinking, and objective observations to generate knowledge and understanding of the natural world. It is a fundamental process used in scientific research to ensure rigor, reliability, and validity in the pursuit of scientific knowledge.

Qualitative

Qualitative research is a type of research that aims to understand and interpret human behaviour, experiences, and social phenomena through the collection and analysis of non-numerical data, such as words, images, and narratives. Qualitative research methods are used to gather rich, contextual, and subjective data that allows for in-depth exploration and understanding of complex or nuanced phenomena.

HELPFUL ONLINE RESOURCES

Type of Qualitative research methods
https://tinyurl.com/yc5dpb5m

Figure 6.2.1: Facets of a focus group.

Focus Group

A focus group is a qualitative research method that involves a group of around 6-12 participants engaging in a structured discussion facilitated by a researcher to gather data on their perceptions, opinions, attitudes, and experiences. It is typically used to explore participants' perspectives, generate insights, and understand the meanings and interpretations they assign to certain phenomena. Focus groups are used to collect qualitative data through group interactions, discussions, and exchanges of ideas. The researcher poses open-ended questions and encourages participants to share their thoughts and ideas with each other in a group setting. The discussion is typically audio-recorded and collected by an assigned scribe who is not part of the group discussion. Data obtained from the discussion are typically analysed using qualitative analysis techniques such as content analysis.

The main **advantages** of focus groups are:

The richness of the qualitative data that can be generated - people are uninhibited, and are not limited by a Yes/No response or rating scale where they cannot elaborate on an response.

- The groups are generally easy to organise and sessions are relatively inexpensive to conduct.
- Focus groups are also useful for collecting information from people who have difficulty reading or writing or have other communication difficulties.
- "Safety in numbers' factor may also be an advantage within a group situation. It can encourage the participation of those who may normally be uncomfortable or anxious about revealing information about themselves to an interviewer in a one-to-one interview.
- Participants can bounce ideas off each other, and be inspired, or it may jog their memory when one person talks. This information may not have been elicited in a one-to-one interview.
- Technology has enhanced researcher's ability to conduct focus groups with people who are not physically in the same location.

HELPFUL ONLINE RESOURCES

Watch these amusing videos showing a Focus group being conducted.
https://tinyurl.com/mh5bmdx3

https://tinyurl.com/5dry4kam

The main **disadvantage** of focus groups is:

- Dominant participants – some people may not allow others to talk.
- Some participants may not feel comfortable expressing a particular response in front of others.
- The presence of other research participants does not enable the confidentiality of more conventional research settings.

Delphi Technique

This technique is useful to obtain information about a research question or problem from experts or a group of individuals, each of whom has individual expertise about a topic, but it is not possible to bring the participants together. Used for complex problem solving and the aim is to obtain a consensus of opinion in a group.

The Delphi Technique follows the following format:

- A series of questionnaires to be used to gather the opinion of a targeted group of people is sent to experts.
- An initial questionnaire with open ended questions which allow for written qualitative responses is sent to participants
- Subsequent questionnaires are sent, once responses to the first questionnaire have been collated.
- Responses are collated by a panel of experts who identify categories and themes in the data, then this info is returned to the participants for further feedback.
- This process continues until consensus is reached or enough information has been gathered.

The Delphi Technique has practical **advantages** of:

- Enabling a small or large group of experts to be contacted inexpensively, through post or email.
- Using a self-administered questionnaire (in hard copy or online), with few geographical limitations.
- Seeking to maximize the benefits of having informed people consider a problem while minimizing the disadvantages associated with group decision-making in face-to-face meetings.
- Using successive rounds of questions that include feedback on overall group responses to help ensure participants consider alternative views and options.
- Reducing the likelihood of participants being swayed by social desirability bias as they construct their answers in isolation.

However, the Delphi technique has also been criticized as the researcher may force consensus, and the agreed-upon opinion(s) may be weakened by not allowing participants to discuss issues.

Interviews

Interviews in qualitative research can be unstructured, consisting of a small number of general questions or prompts that allow participants to talk about what is of interest to them. Alternatively, interviews can be structured, following a strict script that the interviewer does not deviate from. Most interviews are a combination of both and are called semi-structured interviews, where the researcher has a few consistent questions and can follow up by asking more detailed questions about the topics that come up. Such interviews can be lengthy and detailed but are usually conducted with a relatively small sample.

The **advantages** of interviews are similar to those of focus groups; however, an additional advantage reported is that people may feel more comfortable talking in a one-to-one situation compared to a group interview. The researcher can tailor questions to elicit responses and ask the participant to expand on their previous answers. A related disadvantage of interviews is that the researcher may bring bias to their questioning and not ask questions that encourage the participant to open up or be honest in their responses. In a structured interview, the pre-set questions do not allow the researcher to deviate and explore other interesting or important information identified.

Figure 6.2.2: Qualitative research methods.

HELPFUL ONLINE RESOURCES

Watch the following recap video clip by Aimee explaining the Essential features of Qualitative research designs.
https://tinyurl.com/4bjjntv6

Quantitative Research

Quantitative research is a research approach that focuses on the collection, analysis, and interpretation of numerical data. It involves the use of structured methods for data collection and statistical techniques for data analysis. The goal of quantitative research is to systematically gather empirical evidence to answer research questions or test hypotheses, and to draw conclusions based on the analysis of numerical data.

Quantitative research is often used in fields such as social sciences, psychology, education, business, and health sciences. It typically involves the use of surveys, experiments, structured observations, or secondary data analysis to collect quantitative data, which can be analysed using various statistical methods to identify patterns, relationships, or trends in the data.

Some characteristics of quantitative research include:

- Objective and standardized data collection: Quantitative research often involves the use of structured surveys or questionnaires to collect data in a standardized manner, with the aim of minimizing bias and subjectivity in data collection.
- Numerical data analysis: Quantitative data is typically analysed using statistical techniques to identify patterns, relationships, or trends in the data. Statistical analysis allows researchers to make inferences and draw conclusions based on the probability of certain findings.

- Generalizability: Quantitative research often aims to draw conclusions that can be generalized to a larger population beyond the sample studied, using statistical techniques to infer findings to the broader population.
- Large sample sizes: Quantitative research often involves the collection of data from a large sample of participants, which allows for statistical analyses that can provide more reliable and valid results.
- Deductive reasoning: Quantitative research often starts with a specific research question or hypothesis, and data is collected and analysed to test or support the research question or hypothesis.

Experimental design

In an experimental design, the researcher manipulates an independent variable (IV) to observe its effect on a dependent variable (DV) while controlling for other variables. The goal is to establish cause-and-effect relationships between variables. Quantitative data, typically in the form of numerical measurements, is collected during the experiment and analysed using statistical techniques to draw conclusions.

For example, a researcher interested in investigating the effects of a new drug on blood pressure may conduct a randomized controlled trial (RCT) in which participants are randomly assigned to either a control group (receiving a placebo) or an experimental group (receiving the new drug). Blood pressure measurements are taken before and after the intervention, and the data is analysed quantitatively using statistical tests to determine if there are statistically significant differences in blood pressure between the two groups.

Advantages of Experimental Research:
Causality: Experimental research allows researchers to establish causal relationships between variables. By manipulating the independent variable and randomly assigning participants to different conditions, researchers can determine the cause-and-effect relationships between variables with a higher degree of confidence.

Control: Experimental research provides a high level of control over the research environment, including the ability to manipulate variables, control for confounding variables, and standardize procedures. This allows researchers to isolate the effects of the independent variable and minimize potential biases, increasing the internal validity of the study.

Replicability: Experimental research is often highly replicable, as researchers can carefully control and standardize the procedures, making it possible for other researchers to replicate the study and verify the findings.

Precision: Experimental research can provide precise and quantitative data, allowing for statistical analysis and the ability to draw conclusions based on quantitative evidence

Disadvantages of Experimental Research:
Low ecological validity: Experimental research may take place in a controlled and artificial environment, which may not represent real-world situations. The findings may not always generalize to real-world settings or populations, limiting the external validity or generalizability of the findings.

Ethical Concerns: Experimental research often involves manipulating variables and randomly assigning participants to different conditions, which may raise ethical concerns, such as the potential for harm, deception, or lack of informed consent.

Limitations in Scope: Experimental research may have limitations in terms of the scope of research questions that can be addressed. Some research questions may not be amenable to experimental manipulation or may not be practical to conduct in an experimental design.

Time and Resource Intensive: Experimental research can be time-consuming and resource-intensive, requiring careful planning, implementation, and data collection. It may also require a larger sample size to achieve sufficient statistical power, which can be costly and time-consuming.

Potential for Bias: Despite efforts to control for confounding variables, experimental research may still be subject to biases, such as selection bias, measurement bias, and experimenter bias, which may affect the internal and external validity of the findings.

HELPFUL ONLINE RESOURCES

This video will discuss the key features of conducting Experimental research. You will cover these concepts in the following pages.
https://tinyurl.com/bdz49hfj

Observational designs/ Quasi experiments

A quasi-experiment/observation is a type of research design that resembles an experimental design but lacks full randomization or control over the independent variable. The researcher cannot randomly assign participants to different conditions or manipulate the independent variable, as would be done in a true experimental design.

Instead, the researcher takes advantage of naturally occurring groups or conditions and compares them based on their existing characteristics or experience.

Quasi-experimental/Observational designs are often used when random assignment or manipulation of variables is not feasible, ethical, or practical. They are commonly used in situations where researchers want to investigate cause-and-effect relationships but are unable to use random assignment due to ethical concerns, logistical constraints, or other limitations.

An example of an Observational designs: A researcher may compare the academic performance of students in two different schools, where the schools are not randomly assigned, but are assumed to be similar in terms of important variables such as socioeconomic status or prior academic achievement. The IV (schools) are naturally occurring as students attend these schools normally. The DV(academic performance) can still be measured, however the data will provide correlational data only, therefore, a cause and effect relationship cannot be established from this type of research design.

Observational designs have limitations in terms of internal validity, as they may be more susceptible to confounding variables and biases compared to true experimental designs. However, they can still provide valuable insights and evidence in situations where experimental manipulation or random assignment is not feasible, and can be a useful approach in certain research contexts.

Advantages:

- Real-world context: Observational studies are often conducted in real-world settings, allowing for the study of natural behaviours and phenomena in their natural environment, which can enhance external validity and generalizability of findings to real-world situations.
- Ethical considerations: Observational studies are often used when manipulating variables or randomizing participants is not feasible or ethical, such as in studying the effects of certain environmental or social factors that cannot be controlled or manipulated experimentally.
- Cost and time effectiveness: They are often less expensive and time-consuming than experimental designs, as they rely on existing groups or conditions rather than creating and manipulating artificial experimental conditions.
- High ecological validity: Observational/quasi experiments can have high ecological validity, as they allow researchers to study behaviours and phenomena as they naturally occur in real-world settings, without artificial manipulations or controls that may affect behaviour.

Disadvantages:

Lack of control: Observational designs often lack the level of control that experimental designs have, making it difficult to establish cause-and-effect relationships between variables.

There may be confounding variables that cannot be fully controlled or accounted for, which can limit the internal validity of the findings.

Limited ability to infer causality: Because observational/quasi experiments do not involve randomization or experimental manipulation, it may be challenging to establish causality between variables. There may be alternative explanations for the observed relationships, and researchers must be cautious in making causal inferences.

Selection bias: Observational/quasi experiments may suffer from selection bias, as participants or groups may not be randomly assigned, leading to potential differences in baseline characteristics or pre-existing group differences that can affect the validity of the findings.

Limited generalizability: The findings of observational/quasi experiments may not be as generalizable as experimental designs, as they may be specific to the particular settings, populations, or conditions studied, and may not be applicable to other contexts or populations.

Potential for confounding variables: Observational/quasi experiments may be vulnerable to confounding variables, as there may be factors that are not accounted for or controlled, which can affect the validity of the findings.

It's important for researchers to carefully consider the advantages and disadvantages of observational/quasi experiments when selecting the appropriate research design for their study and interpreting the findings.

Key differences between Experimental and Observational Research:

Control over variables: Experimental research allows for greater control over variables, including manipulation of independent variables by the researcher, random assignment of participants to groups, and control over extraneous variables. Observational/quasi-experiments, on the other hand, may have limited control over variables due to the lack of random assignment and manipulation of variables.

Causality: Experimental research is designed to establish cause-and-effect relationships between variables, as it involves the manipulation of independent variables and random assignment of participants to groups. Observational/quasi-experiments, on the other hand, can only establish associations or correlations between variables, and cannot establish causality due to the lack of experimental control.

The key to identifying a research design as observational or experimental, is whether the **IV** (independent variable) is manipulated by the researcher or not. In an observational design, the researcher **does not** manipulate the IV.

Internal validity: Experimental research tends to have higher internal validity, as the researcher has control over variables and can establish cause-and-effect relationships with a higher degree of confidence. Observational/quasi-experiments may have lower internal validity due to the potential confounding variables and lack of experimental control.

Generalizability: Experimental research, when conducted in controlled laboratory settings with random assignment, may have limited external validity or generalizability to real-world settings or populations. Observational/quasi-experiments, on the other hand, are often conducted in naturalistic or real-world settings, allowing for greater generalizability of findings to broader populations or settings.

Ethical considerations: Experimental research may involve ethical concerns related to manipulation of variables, random assignment, and potential harm to participants.

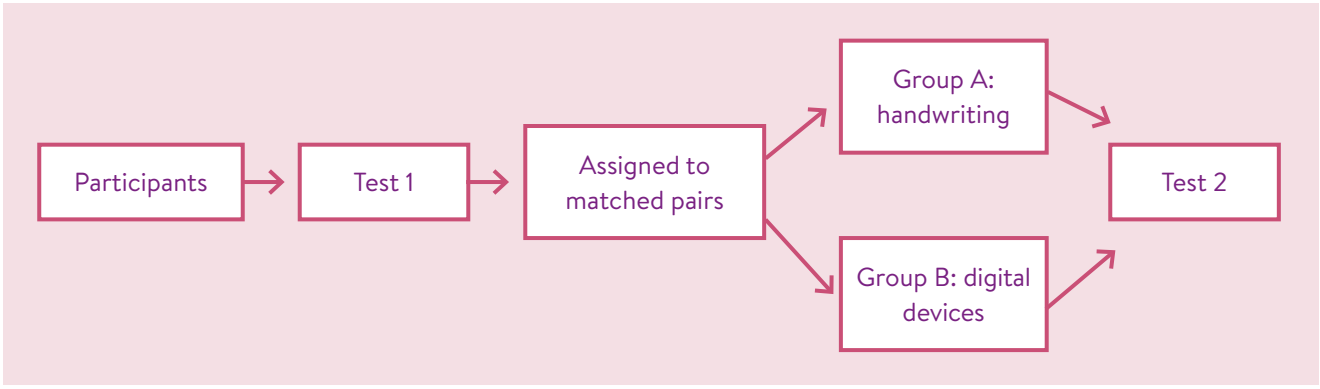
Observational/quasi-experiments may have fewer ethical concerns, as they typically involve observation of naturally occurring events or variables without manipulation or random assignment.

Research design: Experimental research typically follows a rigorous research design with controlled manipulation of variables, random assignment, and control groups. Observational/quasi-experiments, on the other hand, may have less rigid research designs due to the lack of experimental control and random assignment.

Practicality: Observational/quasi-experiments are often more practical and feasible in real-world settings where experimental control and random assignment may not be feasible or ethical. Experimental research, on the other hand, may be more suitable in controlled laboratory settings with strict control over variables.

HELPFUL ONLINE RESOURCES

https://tinyurl.com/mrxnxfne



Justify why this investigation is an experimental design. In your response identify the IV, DV and explain why the researcher placed the participants into matched pairs.

CHECKING FOR UNDERSTANDING:

1. What type of data is typically collected and analysed in qualitative research?
a. Numeric data
b. Descriptive data
c. Categorical data
d. Both a and c

2. What is the main goal of qualitative research?
a. To establish cause-and-effect relationships
b. To describe and understand social phenomena in-depth
c. To test hypotheses and theories
d. To quantify and analyse data statistically

3. What is the main goal of quantitative research?
a. Understanding subjective experiences
b. Exploring social phenomena in depth
c. Quantifying and analysing data statistically
d. Gathering rich, descriptive data

4. Which of the following research methods is an example of qualitative research?
a. Survey
b. Experimental research
c. Delphi technique
d. Randomized controlled trial

5. Which of the following is the most common method of data collection in quantitative research?
a. In-depth interviews
b. Observations
c. Surveys
d. Content analysis

6. What is the purpose of a control group in an experimental research design?
a. To provide a basis for comparison
b. To manipulate the independent variable
c. To determine causality
d. To ensure external validity

7. Which of the following is a common method of data analysis in qualitative research?
a. Statistical analysis
b. Content analysis
c. Descriptive analysis
d. Inferential analysis

	TRUE	FALSE
Experimental research allows for the establishment of cause-and-effect relationships between variables.		
Observational designs have higher internal validity compared to experimental research		
Experimental research typically involves manipulation of independent variables by the researcher.		
Observational designs are considered less rigorous and less reliable compared to experimental research		
Random assignment of participants to groups is a common feature of quasi-experiments		
Experimental research is often conducted in controlled laboratory settings		
Observational designs are useful when random assignment is not feasible or ethical.		
Experimental research allows for generalizability of findings to a broader population.		
Observational designs are more practical and applicable in real-world settings compared to experimental research.		
Experimental research is typically characterized by high internal validity due to the control over extraneous variables		

MULTIPLE CHOICE ANSWERS: B,B, C, C,C, A,B.
TRUE/FALSE: T,T,T,F,T,T,T,F,T,T,

ADVANTAGES AND DISADVANTAGES OF OBSERVATIONAL DESIGNS

Summarise the main difference between experimental and observational research in their design.

As a result of this difference, explain the main advantage and disadvantage of using an observational design.

Identify the appropriate investigation method for the following research ideas and justify your answer.
A researcher wants to investigate the effect of a new teaching method on student learning outcomes.

A researcher wants to study how people's mood changes throughout the day.

A researcher wants to explore the relationship between social media use and self-esteem in teenagers.

A researcher wants to examine how children's behaviour changes in response to different types of rewards.

A researcher wants to investigate the impact of different types of music on people's productivity.

Negotiating roles in a team

Negotiating the role of each member with the other members of a team is an essential process in ensuring that the team functions effectively.

One key aspect of role negotiation is the recognition that each member of the team brings unique strengths and weaknesses to the table. By acknowledging and leveraging these individual differences, teams can achieve more collectively than any member could achieve alone. However, this requires a willingness on the part of each team member to be open and honest about their strengths and limitations, as well as a willingness to adapt to the needs of the team.

Another important psychological factor that influences role negotiation is communication. Effective communication is essential for ensuring that each member of the team has a clear understanding of their role and responsibilities, as well as an understanding of how their role fits into the larger team dynamic. Communication can also help to build trust and rapport between team members, which is essential for fostering a sense of cohesion and shared purpose.

However, negotiating roles within a team can also be a source of conflict and tension. One common source of conflict is when team members have differing expectations or assumptions about their roles and responsibilities. This can lead to misunderstandings and confusion, which can ultimately undermine the effectiveness of the team. Additionally, conflicts can arise when team members feel that their contributions are not being valued or recognized, or when there is a perceived power imbalance within the team.

Figure 6.2.3: Working as a team.

To overcome these challenges, it is important for team members to engage in active listening and to be willing to compromise and make adjustments to their roles as needed. This requires a degree of flexibility and adaptability, as well as a willingness to view the team's success as a collective goal rather than an individual one.

In conclusion, negotiating the role of each member with the other members of a team is a critical process that can have a significant impact on team dynamics and performance. Effective role negotiation requires a willingness to acknowledge and leverage individual strengths and weaknesses, clear communication, and a willingness to be flexible and adapt to the needs of the team. By prioritizing these factors, teams can achieve their goals and accomplish more than any individual could on their own.

HELPFUL ONLINE RESOURCES

https://tinyurl.com/3svpkptn

SIS3 INVESTIGATION DESIGNS

Scientific methods enable systematic investigation to obtain measurable evidence.

- Deconstruct a problem to determine and justify the most appropriate method for investigation.
- Design investigations, including:
  - a hypothesis or inquiry question
  - types of variables
    - dependent
    - independent
    - constant
    - extraneous
    - the method to be followed
    - justification of the method
    - the type and amount of data to be collected
    - identification of ethical considerations and how these may be addressed
    - identification of sociocultural considerations and how these may be addressed.

Using information from a range of sources, critically evaluate and appropriately acknowledge those sources.

2023 Subject Outline | Stage 1

Design Investigations

INDEPENDENT AND DEPENDENT VARIABLES

In the context of scientific research and experimentation, a variable is any factor, condition, or characteristic that can vary or change and can have an impact on the outcome of a study or experiment. Variables are used to measure, observe, or manipulate different aspects of a phenomenon to understand their relationships or effects.

Typical variables researched in the field of psychology include:

- IQ
- Feelings of wellbeing
- Scores on a test
- Concentration levels
- Responses to treatment
- Age
- Gender
- Race
- Performance at school

Every research design has at least one **independent variable** and one **dependent variable.**

An **independent variable (IV)** is deliberately manipulated, or changed, by the researcher to determine its effect on another variable. The researcher plans to manipulate this variable when they are designing their investigation. In the body positivity research, the researchers deliberately changed the lyrics of the song that the participants listened to. The lyrics were either body positive lyrics, body objectifying lyrics, or neutral lyrics.

Typically, simple research involves comparing two groups of people. One group is exposed to the independent variable, and one is not. For example, a researcher may decide to find out the effect of high school students eating breakfast on students' test results. One group of students would eat breakfast, the other would not. The researcher can then make inferences from the results about whether the IV (eating breakfast) made a difference to the student's test results.

The **dependent variable (DV)** is what is measured in the research. Its value *depends* on the IV which is why it is called the dependent variable. In the body image research, the dependent variable was how women felt about their body. In the breakfast example, the DV is the results of the school test. To determine the DV in any psychological research, look for what is being measured. It is typically a number that can be measured with a "tool", such as shoe size, IQ score, test score, rating on a wellbeing scale, heart rate, number of times someone swears, number of compliments.

To remember the difference between the IV and the DV – turn this little phrase into a simple tune.

"Independent's what you change
Dependent's what you measure!"

Operationalising variables. To ensure that researchers are specific about exactly what the IV is, and exactly how the DV will be measured, we use the term operationalisation to draw out these details.

Consider the following example. If a researcher wanted to determine whether drinking caffeine or water made athletes run faster, we could identify:
IV: Caffeine
DV: Time

To ensure the research is more precise, and the intention of the research is clear we would state the variables as follows:
Operationalised IV: the type of drink [coffee or water]
Operationalised DV: the time taken to run 400 metres.

We can now see in detail what is being manipulated and what is being measured, including *how* it will be measured.

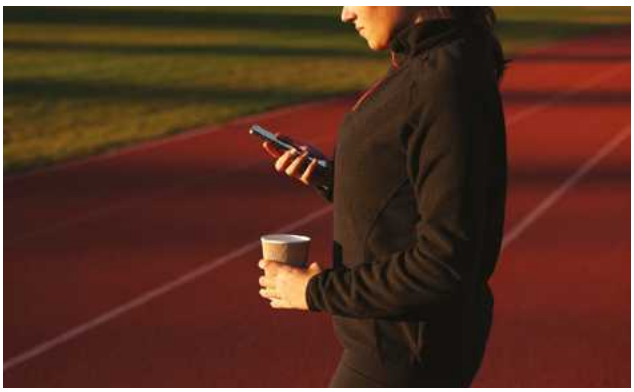


Figure 6.3.1: Does the type of drink (coffee or water) an athlete consumes prior to running, decrease the time taken to run 400 metres?

CHECKING FOR UNDERSTANDING - DECONSTRUCT AND DESIGN PHASE

Operationalise the independent and dependent variables in research

Identify the independent and dependent variables in the following research examples. Operationalise the IV and DV by being as detailed or specific as possible.

1. It is believed that listening to loud music while driving increases the number of accidents in P Plate drivers. To test this a researcher set up a number of orange cones on a driving course. P Plate drivers were asked to drive as quickly as they could around the course, with music playing softly, and loudly. The researcher recorded the number of orange cones hit by the drivers.

   Independent Variable: .....

   Dependent Variable: .....

2. It is believed that listening to white noise (for example, the sound of a fan, or off channel radio station) increases the hours a person will sleep. To test this, participants are asked to play a recording of white noise while they sleep each night for a week and record the total number of hours they sleep each night.

   Independent Variable: .....

   Dependent Variable: .....

3. A researcher is interested in finding out whether adults or teenagers are able to complete mazes faster and with less errors. They seek 20 teenagers from a single school, and one of their parents to participate in some research where they are required to complete 6 mazes in three minutes. The researcher records the number of mazes completed, and the number of errors made.

   Independent Variable: .....

   Dependent Variable: .....

4. A psychologist conducts an experiment to determine if caffeine affects the alertness of people. The amount of caffeine given to participants is manipulated- participants are given drinks containing between 0mg and 150mg of caffeine Participants complete a simple reaction time test 20 minutes after consuming the drink. The reaction time of participants is measured and recorded.

   Independent Variable: .....

   Dependent Variable: .....

5. A group of teachers believe that windy weather can influence children's behaviour at school. They set about counting the number of behaviour referrals for poor behaviour over a two-week period, noting days when it is windy, and days when it is not.

   Independent Variable: .....

   Dependent Variable: .....

6. A University student was interested in finding out whether the temperature of a room influenced cognitive performance. The student divided a group of high school students into three groups. The groups were placed in rooms that were heated to 22°C, 27°C and 33°C. Students were given 15 questions from a NAPLAN Maths test to complete in 20 minutes.

   Independent Variable: .....

   Dependent Variable: .....

Formulating a hypothesis or research question

Once a researcher has identified the variables they are interested in researching, they need to make an educated guess about what will happen in the research, in other words, they will hypothesise about the relationship between the IV and the DV.

A **hypothesis** is a statement, or testable prediction about the likely results of the research. It is what the researcher believes is likely to occur as a result of conducting the research.

A hypothesis should clearly state the population about which the researcher intends to research so that similar research can be conducted and repeated in the future.

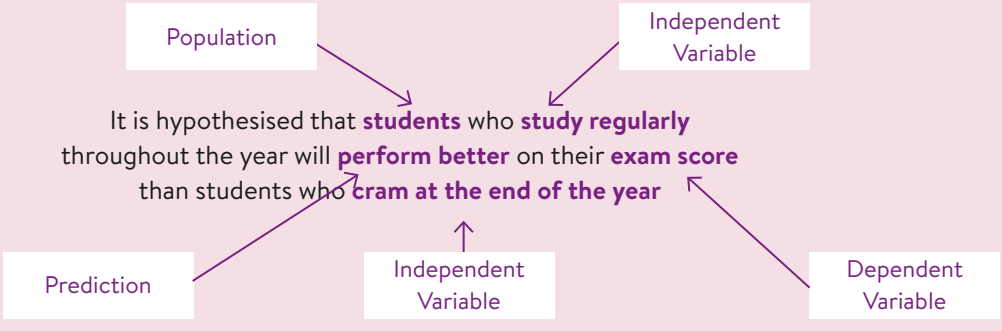
A hypothesis should contain the following elements:

1. A testable prediction about the direction of the interaction between the variables (i.e. – is the DV going to increase or decrease, it is going to be higher or lower as a result of the IV).
2. The population from which the sample is going to be drawn (who are the participants in the research).
3. The independent variable that is being manipulated.
4. The dependent variable that is being measured.

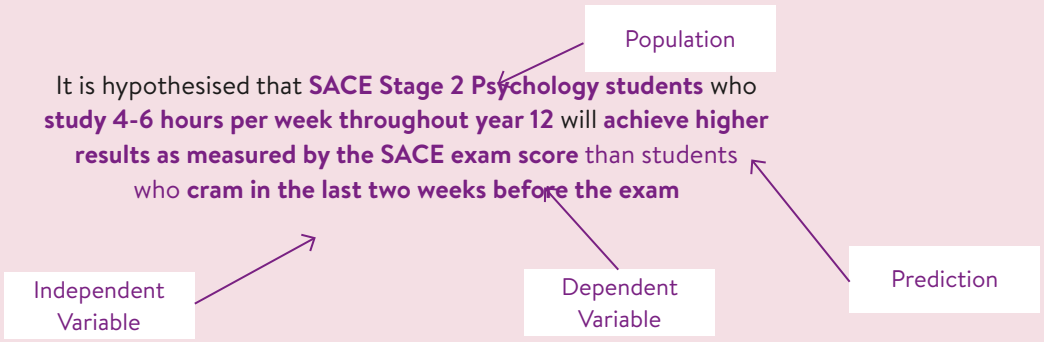
A **research question** is typically used for Qualitative research, where the findings of the research are likely to come from interviews, thoughts, feelings and statements from participants rather than in numerical form that can be measured through a prediction or hypothesis.

Note the difference between the wording of the two hypotheses below.

A SIMPLE HYPOTHESIS



AN OPERATIONAL HYPOTHESIS



Qualitative Research Questions:

1. Usually start with 'what' or 'how' (avoid beginning qualitative questions with 'why' as this implies cause and effect).
2. Identify the central phenomenon you plan to explore (tell in your question what you are going to describe, explore, generate, discover, understand).

With qualitative research, you will usually have one central question and possibly also some sub-questions to narrow the phenomenon under study further. The sub-questions will generally be more specific.

Examples of qualitative research questions:

1. What are the impacts associated with the social isolation of working from home?
2. What are the experiences of people working night shifts in health care?
3. How would a 4-day working week impact on mental health of employees in Australia?

CHECKING FOR UNDERSTANDING- DECONSTRUCT AND DESIGN PHASE

Writing a hypothesis or research question

For each of the following scenarios, identify the independent and dependent variables, and formulate a hypothesis.

1. Mitchell is interested in whether stress has an impact on teenagers' ability to fall asleep. He investigates a group of 80 year 12 students in South Australia. Students are selected from a pre-test which identifies them as having either high or low levels of stress. Each student keeps a sleep diary for a week and writes down an estimate of how long it took them to fall asleep each night. An average of the time taken to fall asleep over the 7 days is calculated.

   Independent Variable: ..

   Dependent Variable: ..

   Hypothesis: ..

   ..

   ..

   ..

   ..

2. David is interested in whether the colour of the music room affects anxious students' ability to perform their music without error. He believes the darker the space, the calmer the student will be, therefore enhancing their ability to perform. David paints one room a dark colour another pale blue and leaves a third room white. Three year 12 students with anxiety are given the opportunity to perform their exam piece in each of the three rooms. David measures each student's performance by counting the errors in the performance for each room.

   Independent Variable: ..

   Dependent Variable: ..

   Hypothesis: .

   ..

   ..

   ..

   ..

For each of the following scenarios, write an appropriate research question.

3. A researcher found some data that showed that the proportion of young women who are smoking is increasing, whereas it is decreasing for all other groups. They were interested in finding out possible reasons for this. The researcher decides to conduct a focus group to investigate this topic and needs to come up with a research question to investigate.

   Research Question: ..

   ..

   ..

   ..

   ..

4. 'Binge drinking is a health hazard' is a message that Kylie is interested in researching in her University course. She has seen different advertisements for health campaigns targeting 'binge drinking' in the media and is interested in finding out whether these campaigns are effective, and whether other sorts of persuasive messages could be used to stop 'binge drinking' instead. Write a research question that Kylie might investigate.

   Research Question: ..

   ..

   ..

   ..

   ..

Constant and Extraneous variables

A **constant** is a value that remains the same. When conducting an experiment, it is important for the researcher to maintain control over the many variables that could affect what they are trying to investigate. Ideally, when a researcher designs the research, the only thing that should vary is the **IV** that is being studied. All other factors that could affect the outcome must be strictly controlled by keeping them constant.

For example, consider Scenario 1 from the previous page where Mitchell is trying to determine whether stress impacts a teenagers' ability to fall asleep. Factors such as the specific age of the teenager, their gender, their part time work, the combination of subjects they are studying, the size of their bed, the time of year, weather, relationship status, location of their house, passing traffic, general health and fitness may all be reasons why a teenager may or may not have trouble falling asleep.

In order to make sure that any differences in time taken to fall asleep can only be attributed to the level of stress, the researcher must find a way to control all of the other factors that could affect the time it takes to fall asleep.

One way of doing that is by turning all of those other factors into constants. To do this, the researcher could select participants that have the same characteristics such as:

- No part time job
- Studying 4 year 12 subjects
- 50% male, 50% female
- Living in the same town
- All with good health and fitness levels
- All participants must record data in the same week

Even then there may be other variables that interfere with the data. These are called **extraneous variables.**

In an ideal research scenario, the researcher *plans* to eliminate as many extraneous variables as possible, by *planning* to keep as many variables as constant as possible. An **extraneous variable**, by definition, is any variable other than the IV that could cause an unwanted or unplanned change in the DV.

Extraneous variables interfere with the **causal link** between the IV and DV and make it difficult to determine whether the IV (in Mitchell's case the levels of stress) affect the DV (time taken to fall asleep). Due to this unwanted effect of EVs, the researcher needs to take this into consideration in the planning stage (in SACE Psychology this is the Deconstruction and Design phase of your investigation). There are a number of different types of extraneous variables.

PARTICIPANT VARIABLES

One of the main ways to eliminate extraneous variables is to ensure that participants are as similar to one another in a range of characteristics. Participant variables include biological sex, intelligence, personality characteristics, motivation, emotional state, cultural background and so on.

Each of these variables, and many other specific participant variables, can affect the way participants respond in an experiment. Experimenters need to try and take the relevant participant variables into account when they design their experiment.

Researchers attempt to control the impact of participant variables by ensuring, as far as possible, that participants in different groups of the experiment are as similar as possible in important personality characteristics and abilities that may influence the results of the experiment. The use of *random assignment* helps researchers to achieve this.

PLACEBO EFFECT

The **placebo effect** is an example of a participant variable and refers to an improvement in health or wellbeing due to an individual's belief that the treatment given to them will be effective. In psychology, the placebo effect occurs whenever a participant's response is influenced by their expectation of what to do or how to think or feel, rather than by the specific procedure which is used to produce that response.

EXPERIMENTER EFFECTS

Personal characteristics of the experimenter and their behaviour during the experiment may unintentionally affect the way in which the research participants respond. Factors such as the experimenter being tired, in a bad mood, unwell or bringing bias to the way instructions are provided to different groups of participants are examples of experimenter effects.

DEMAND CHARACTERISTICS

Occasionally participants behave in a socially desirable way in attempt to live up to the experimenters expectations and in attempt to support the hypothesis, otherwise known as the good-participant role.

The negative-participant role is where the participant attempts to discern the experimenter's hypotheses, but only to destroy the credibility of the study.

SITUATIONAL VARIABLES

There can also be differences in how participants react in the experimental environment. All participants in the different groups of the experiment must be tested under the same conditions and in the same situation in order for the experimenter to more confidently conclude that any change in the DV is as a direct result of the IV. It is therefore important to *standardise* each test and its procedures so that the test and all test conditions are the same each time the test is administered, including the way the instructions are given.

Figure 6.3.2: When trying to investigate the effect of cramming versus systematic study in preparation for an exam, it is important to ensure that participants are similar in other characteristics such as age, time spent in class, the way instructions are given for each student, and the time of day the exam is sat.

CONFOUNDING VARIABLES

If extraneous variables are not controlled, and they do have an effect on the DV, they become **confounding variables**. This means that an EV, not the IV caused a change in the results.

Population and sample

Experimentation is the most widely used research design for learning about thoughts, feelings and behaviour. The people used in psychological research are called *participants*. It is impossible, impractical, and too costly to conduct research with *all* members of a population. Students often confuse the term population in a research scenario, with the whole population of Australia, or the whole population of the world.

POPULATION

In research, the **population** is the entire group of people belonging to a particular category that you are interested in researching. For example: teenagers, pregnant women, smokers, university students, AFL players.

In research terms, it is the larger group of people that we are interested in researching about, from which a **sample** is drawn.

For example, if you were interested in researching about the number of injuries in AFL players in Australia, the population is all AFL players registered to play this year.

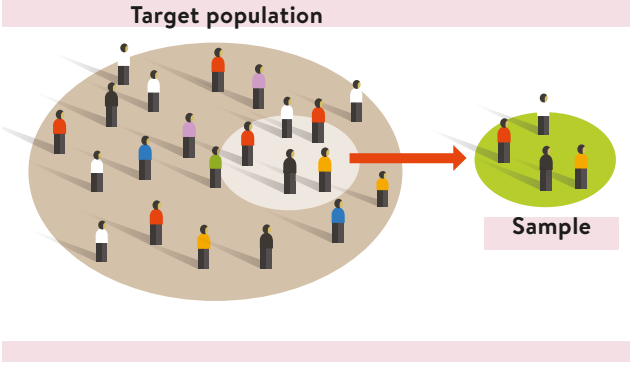


Figure 6.3.3: A sample is drawn from the larger population.

SAMPLE

The group of participants who are selected and participate in the research are called the **sample.**

It is important that the sample of participants most closely matches the population and minimises any participant extraneous variables. This way the researcher can be confident that the sample accurately represents the whole population, and therefore any conclusions drawn from the sample, can be generalised (or applied) to the whole population.

Consider gathering research on students in your high school. The population is all students from years 7 – 12 at your school. If, however, when you are selecting your sample, you just use the students in your year 12 maths class, this does not adequately or accurately represent the population, as the sample does not contain students in years 7 – 11 and may also contain gender bias depending on how many males and females are studying year 12 maths.

It is very important to carefully design and select a sample to represent the population, as conclusions will be drawn from the sample, and applied to the population at the conclusion of the research. It is important that the sample is **representative** of the population.

Types of sampling

CONVENIENCE SAMPLING

As the name implies, this is likely to be the type of sampling used by students and teachers at high school, as it is quick and convenient. It involves selecting the sample from a group of people that the research has access to. In a high school setting, the teacher has access to students in their own school. It would take a lot more time, effort,

communication and persistence to gather a sample of high school students randomly from across South Australia for the purposes of research.

The main advantage of this technique is that it is convenient, however this sampling technique may contain a range of bias, in the form of participant variables, as the students all live in the same geographic area, all go to the same school, have the same teachers. This sample therefore does not represent the population accurately.

RANDOM SAMPLING

Researchers prefer to use random sampling wherever possible as it is a more systematic and carefully planned process for selecting the research sample. With random sampling, every member of the population has an equal chance of being selected in the sample.

The most common ways random selection occurs, is pulling names out of a hat, using names of participants from a list of the population (for example from the electoral role, or from the student list of a school, AFL club). Alternatively members of the population are given a number to represent them, and then random numbers are selected to be in the sample.

Figure 6.3.4: Random sampling includes selecting names at random like a lottery.

The main advantage of using this process is that it is quick, and easy to use if the names of the population are known, and is not biased. However, by chance, the sample may still not be completely random, as it may accidentally select an uneven number of males and females for example.

STRATIFIED SAMPLING

Similar to random sampling, **stratified sampling** breaks the population down into smaller groups, and random samples are taken from the smaller groups in the same proportion as they appear in the population. If you wanted a sample from your school, you would select your sample of males and females, different cultural groups, and year levels in the same proportion as the population. If there are less year 12s, than year 7s in the school, then the sample would also have less year 12s than year 7s. The greatest advantage is that samples selected using this method are the most representative of the population, therefore eliminating participant extraneous variables.

Experimental Designs

INDEPENDENT GROUPS DESIGN

One common design involves allocating participants to two types of groups – an **experimental group** (which is exposed to the IV) and a **control group** (which does not experience the IV). For example, if testing the effectiveness of a new teaching methodology a teacher who has 2 classes may use the new technique with one class (the experimental group) and not use the teaching technique with the other class (the control group).

The **control group** creates baseline data to compare the impact of the IV on the DV. This allows the teacher to compare the effect of the teaching technique to see which class understood the topic better.

To minimise bias in the two groups, however, the researcher should consider how they allocate participants to the two groups, rather than using the two groups which already exist. In an experimental design the best way to make sure that each participant has an equal chance of being allocated to either group is via **random allocation** (also called **random assignment**).

Random allocation can be achieved by allocating ID numbers or names using a computer program, simply flipping a coin, drawing names out of a hat, or any system which creates a equal chance of each participant being in either group

If the sample is large enough, the researcher can be confident that each group will contain about equal numbers of most participant variables that can affect the results. Random allocation is different from *random sampling*. Random allocation is used to *place* participants in groups, whereas random sampling is one of the methods that can be used to *select* participants for an experiment.

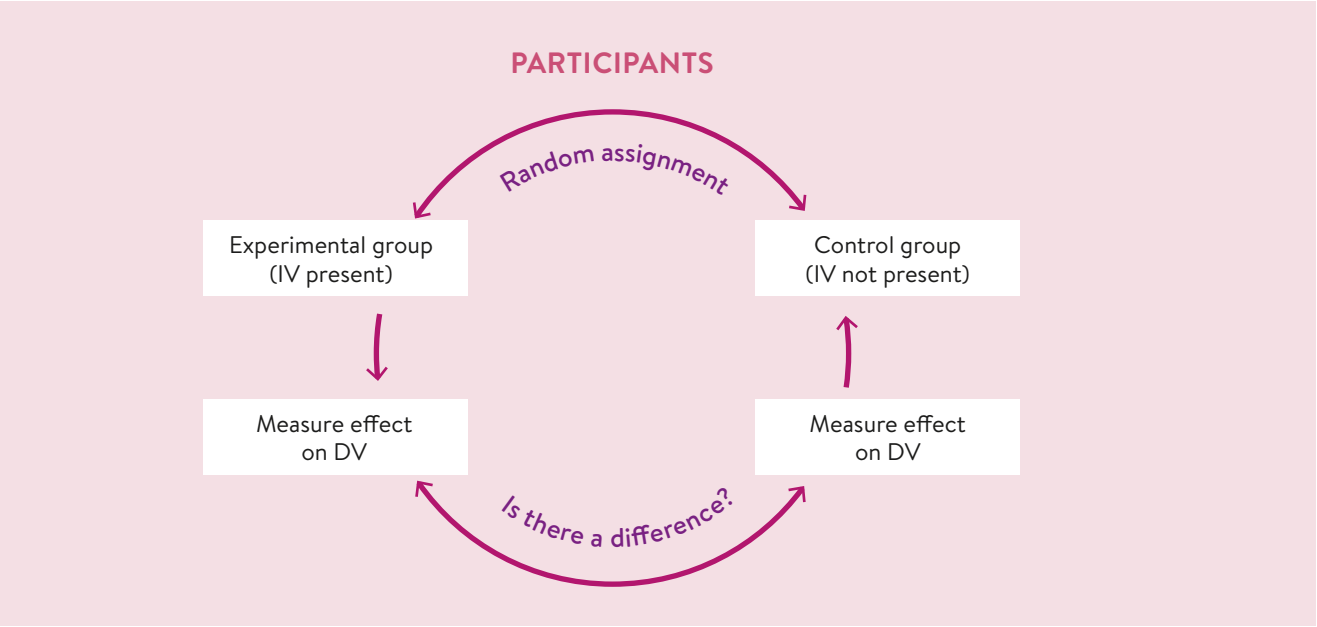


Figure 6.3.5: Random allocation.

Twin Studies

One way to eliminate participant extraneous variables as a potential confounding variable is to use participants as similar to each other as possible. Twin studies, especially with identical twins are often used in psychological research, particularly on the topic of nature v nurture.

To counter the **placebo effect,** because participant expectations can influence the results of an experiment, it is important that participants do not know whether they are in an experimental or control group. To enable this, the experimenter can use a single-blind procedure so that participants are not aware of (are 'blind' to) the condition of the experiment to which they have been assigned.

MATCHED PARTICIPANTS DESIGN

The matched participants design seeks to eliminate differences between the participants by allocating participants with similar characteristics to each group.

For example, if a researcher was interested in the effects of a new phone app aimed at increasing memory in elderly people, the participants might be required to complete a memory test as part of the pre-testing for the experiment. The researcher would match the people with the highest scores, then randomly allocate one to each of Group A and Group B. They would then match the next 2 people with the highest scores, and randomly allocate them to Group A and Group B. This design is less random in one sense, but more deliberate in ensuring the experimental and control groups are as similar as possible.

The advantage of this design aims to minimise the extraneous variable that may arise from participant variables, for example random allocation may accidentally place all the people with better memory in Group A. The limitation is the time and effort taken to pre-test and pre-survey participants to identify key characteristics that would require dividing into the two groups, and whilst it does seek to minimise participant variables, if one person withdraws from the research, then the matching participant must also withdraw from the research, or the groups will be unbalanced.

REPEATED MEASURES DESIGN

A repeated measures design uses only one group of participants who are exposed to different experimental conditions. This experimental design has the advantage of the participants being identical in characteristics and abilities between the two experimental conditions, eliminating participant variables as an EV.

CHECKING FOR UNDERSTANDING DECONSTRUCT AND DESIGN PHASE

Identify a population, sample and sampling technique

Identify an appropriate sample that might be used to conduct the following research topics, a population from which the sample may be drawn, and the type of sampling procedure the researcher might use.

Research Topic	Population	Sample	Type of Sampling
Does using social media after 10pm impact teenagers' ability to fall asleep?	High school students in metropolitan Adelaide	2000 Students enrolled in SA high schools in metropolitan Adelaide	Random Sampling using Department for Education database
Does using social media after 10pm impact teenagers' ability to fall asleep?	High School students at my current school	50 students from year 7 – 12, equal male and female	Convenience sample and Stratified sample using enrolment data at my school
Does watching violent computer games increase the likelihood of road rage?			
Does a red sports uniform increase the likelihood of winning a match?			
Does having a pet increase wellbeing for people who are retired from work?			
What age should children stop having a daytime nap before starting school?			
Where should you hold your school formal this year?			

This design may or may not contain a control condition but may have several **experimental conditions** in which the same participants are exposed to the different variables. For example, when looking at the effect of caffeine on concentration, a researcher may create several conditions for the same group of participants – exposure to 0mg, 2mg, 5mg, 10mg of caffeine. This does not require allocation to different groups.

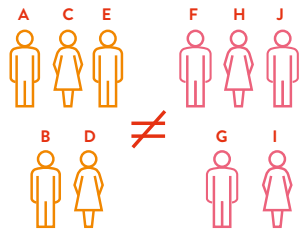
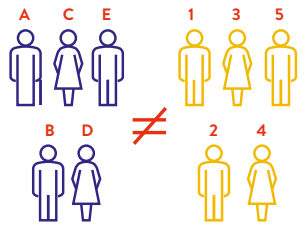
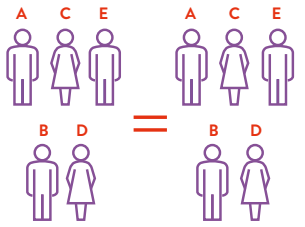
One disadvantage of a repeated measures design is the creation of order effects. Consider the implications for the Caffeine experiment above if increasing amounts of caffeine are given to participants one after the other. The build-up of caffeine may become an extraneous variable if the research was conducted all on one day. This can be eliminated by counterbalancing. The researcher would divide the participants in half and have them complete the different experimental conditions in a different order.

Longitudinal study. Longitudinal research is a type of research design used in various fields, including psychology, where data is collected from the same group of participants or subjects over an extended period of time. The main characteristic of longitudinal research is its focus on observing and measuring changes that occur within individuals or groups over time. An example of a longitudinal study in Psychology is the study of Genie. Look it up!

CHECKING FOR UNDERSTANDING DECONSTRUCT AND DESIGN PHASE

Advantages and Disadvantages of Experimental Designs

Complete the table by comparing the different experimental designs

	Explanation	Advantages	Disadvantages
Independent groups design 			
Matched participants design 			
Repeated measures design 			

STEPS IN RESEARCH

Step 1 - Deconstruct: Identify the area for future research and determine the research aim.
- What is the problem?
- What are you aiming to find out?

Step 2 - Deconstruct: Do background research and collect information
- Do background research and collect information
- Brainstorm and break the problem down into smaller parts
- Refine ideas. Which components will have an impact on the solution?
- Who is the population? What are possible samples?
- What are possible variables to investigate?
- Prioritise the components - which components are likely to be able to be researched?
- Which components are likely to lead to a solution

Step 3 - Design: Identify the research question and formulate a hypothesis
- From the options in the deconstruct phase, identify the hypothesis/investigable question
- Identify independent, dependent, constant and extraneous variables

Step 4 - Design: Design a research method to test the hypothesis
- Determine the type of research design as experimental, observational or qualitative
- Determine the type of data to be collected: objective, subjective or qualitative
- Identify the type and amount of data to be collected
- Identify the ethical and socio cultural consideration and how these may be addressed
- Justify the methods chosen in this research design

Justify the methods chosen in this research design

Step 5 – Collect, present, summarise and analyse the data
- Carry out the research
- Present the data in appropriate graphs and tables
- Calculate and use appropriate descriptive statistics (means, medians)
- Identify and discuss trends, patterns and correlations
- Interpret standard deviations

Step 6 – Evaluate procedures and data
- Identify sources of uncertainty in the data and procedures
- Discuss validity and reliability of the data and procedures including internal and external validity
- Evaluate sample size and sample represent ativeness
- Make specific and meaningful recommendations for subsequent investigations

Step 7 – Draw a conclusion
- Accept or reject the hypothesis/answer the research question
- Select and use evidence and scientific understanding to make and justify conclusions
- Explain the limitations of conclusions
- Explain why the results of some investigations may not lead to definitive conclusions
- Discuss the relevance of the findings beyond the particular study

Step 8 – Report the findings

The report may include:
- Introduction with relevant psychological concepts and either a hypothesis and variables or an investigable question
- The method or process that was implemented
- Identification and management of safety and/or ethical risks
- Results, including tables(s) and/or graphs(s)
- Analysis of results, including identifying tends and linking results to concepts

CHECKING FOR UNDERSTANDING DECONSTRUCT AND DESIGN PHASE

Use the mind map below to deconstruct the following: A researcher wants to investigate the impact of different types of music on people's productivity.

DECONSTRUCTION MIND MAP

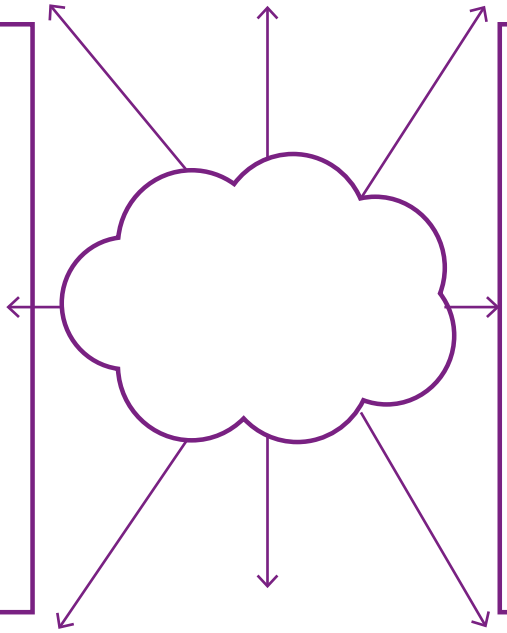
What is the independent and dependent variables?

Will the investigation be an Experiment or an Observation?

Who will the sample be?

How will they be selected?

What are some extraneous variables?



Which variables will need to be controlled?

Which ethical guidelines will I need to consider?

How will the data be collected? Explain how the data will be obtained.

How will the data be presented?

SIS 4 DATA COLLECTION AND PRESENTATION

The researcher interprets raw data that may be objective or subjective, quantitative or qualitative.

- Identify some advantages and disadvantages of using these types of data.
- Results of investigations are presented in a well-organised way to allow them to be readily interpreted.
- Present results of investigations in appropriate ways, such as:
  - construction of appropriately labelled tables
  - drawing of appropriately labelled graphs

2023 Subject Outline | Stage 1

In the realm of psychological research, the collection of data serves as a fundamental cornerstone, offering insights into the complexities of human behavior, cognition, emotions, and interactions. Data collection is a meticulous process that empowers researchers to systematically explore hypotheses, test theories, and uncover patterns that shape our understanding of the human psyche. Methods of data collection play a pivotal role in shaping the validity and reliability of research findings, ensuring that the study's conclusions contribute meaningfully to the field.

Data are the observable facts, or empirical evidence that psychologists, like other scientists collect as a result of conducting the research. Psychologists gather data from direct observation or some type of measurement tool. Data collected directly by the researcher through fieldwork, focus group, observation or experimentation is known as primary data. Data can also be sourced through journal, articles and other people's research. This type of data is known as secondary data.

Data collection

Data may be Quantitative, or Qualitative in nature, and may be objective or subjective.

QUANTITATIVE V QUALITATIVE DATA

Quantitative Data are represented by numbers and can be statistically analysed and presented in table, or graph formats making interpretation of the results simpler for the end reader of the research. Quantitative data allows the researcher to draw conclusions quite easily, however, it also restrict participants from providing in depth reasoning, or elaboration on the thinking behind their responses.

Qualitative Data are often expressed in words, or sentences and describe the quality of behaviour. There is often a story, reasoning, justification, or background to a person's responses which provides the researcher with in depth detail about what a person thinks, feels or believes. Participants can be unrestricted in their responses, however, it is much more difficult to summarise or compare with other data.

OBJECTIVE V SUBJECTIVE DATA

Objective Data

Objective Data can be verified by other researchers, increasing the reliability and validity of the data. Objective data is typically **quantitative** which is in the form of numbers. Data collected in quantitative (numerical) format are easy to statistically analyse, are readily measured and compared with similar numerical data. Quantitative data can also to be represented graphically.

Ways to collect objective data:

Behaviour count. Examples of behaviour counts use measurement tools such as a stopwatch, ruler, checklist. The tools measure things such as running speed, shoe size, height, the number of times a person touches their face, number of correct responses on a test, number of errors in a driving simulator. These behaviours can be measured by multiple researchers, and the results verified, therefore reducing any bias.

Physiological measures. Physiological measures are objective data as they are able to be measured and verified by more than one researcher. They are quantitative in nature as they are able to be measured using a numerical measuring tool. Examples of physiological measures include heartrate, blood pressure, brainwave activity during sleep on an EEG machine or galvanic skin response (which measures the conductivity of the skin).

Figure 6.4.1: The GSR (galvanic skin response) or polygraph is used to measure stress or fear, as our level of stress or fear is associated with an increase in heart rate and perspiration.

Reliability of quantitative measures:

It is common to assume that quantitative measures are 'fool proof' as the results can be verified, but they can be flawed because

- The tool is incorrectly calibrated.
- The user is not trained in its operation.
- External factors may have influenced the results.

Whilst objective data are easy to compare and is collected under controlled conditions using a measurement tool, the reasoning behind the data may be due to external factors is not always obvious. For example, two people may get the same score on a multiple-choice test, however this objective data doesn't take into consideration factors such as stress levels, prior learning, practice, or any number of potentially extraneous variables.

SUBJECTIVE DATA

Ways to collect subjective data:

Observation. Observation occurs when a researcher observes another individual, or group of people in a natural environment and records observations about the behaviour they witness. This type of subjective data is also **quantitative**, as the observations are tallied, or recorded in numerical form.

Consider a scenario where a teacher decides to conduct research into year 12 students' attitudes to wearing school uniform. They may use an observation to gather data by observing the number of students wearing correct uniform, and not wearing correct uniform. This will collate numerical data, as they will have a number of students in each category which can be summarised statistically. For example, 15/25 students were wearing correct uniform, and 10/25 students were not in correct uniform. This data

Figure 6.4.2: Directly observing a person is a subjective quantitative way to collect data.

can be transformed and represented as 60% of students wear uniform, and 40% wearing incorrect uniform, Conclusions can therefore be drawn about attitudes at this school towards wearing correct uniform.

Observation as a data collection method has a limitation: observer bias. This occurs when the observer's interpretation, influenced by personal preferences or expectations, impacts what is observed. For instance, different researchers might interpret the definition of 'correct uniform' differently. This bias can be mitigated by involving multiple observers for the same behaviors.

Self-reports. When participants complete a series of questions, such as via an online form, survey monkey, and they provide responses to questions that provide information about their own thoughts, feelings or behaviours, this is known as a self-report. Data from a self-report survey is **quantitative** in nature, as the data is collected in numerical form, and can be summarised.

There are many different forms of self-report data collection strategies, these may include a **survey** or **questionnaire.** Typically, participants respond to a series of verbal or written questions. These close-ended questions can be in the form of a **rating scale** (such as a **Likert scale** which requires you to rate whether you Strongly Agree, Agree, Neutral, Disagree, or Strongly Disagree with a provocation or statement).

Rating scales can be as simple as your teacher asking you how you are feeling today on a scale of 1-10. Because you are providing information about yourself, and you are guessing, or estimating how you are feeling today, this is a subjective response (the response comes from the subject themselves).

Figure 6.4.3: Anytime you complete an online survey, you are participating in the collection of subjective quantitative data, as you are providing information about your own thoughts, feelings or behaviours. If the responses require a written response, then the data is subjective qualitative.

The advantage of subjective data is that participants are able to provide greater insight into their own personal beliefs, feelings and ideas. These types of topics are unable to be measured with a tool such as a ruler, as the information only exists inside the participant's mind. The limitation of subjective data is that it is difficult to compare with other data and is subject to bias and interpretation. My interpretation of how I am feeling today on a scale of 1-10 may be very different to someone with a chronic illness.

Interviews. An interview is another way of collecting **subjective** data, however, instead of being quantitative like a rating scale, or questionnaire where responses can collate and summarise numerically, an interview generally involves collecting **qualitative data**, as the questions are more open-ended, and elicit more detailed and rich responses. Interviews may be structured and different participants are asked the same questions, or they may be more unstructured with the conversation being more flexible and open to change depending on the responses being given.

Interviews as a data research method are not very time efficient, and require a strategy for collecting the verbal responses, and summarising them, The greatest advantage is in the greater depth of detail that the participant is able to provide that they are not able to if given a rating scale, or yes / no response on a survey.

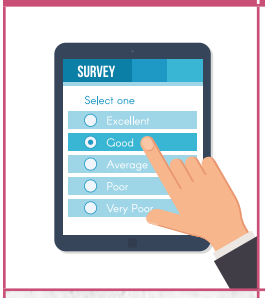
Figure 6.4.4: Talking 1:1 with a researcher enables them to collect subjective qualitative data.

CHECKING FOR UNDERSTANDING
DEMONSTRATE INQUIRY SKILLS BY IDENTIFYING DATA FROM DIFFERENT SOURCES

Advantages and Disadvantages of each type of data

Identify which type of data collection is being shown in the pictures below, and in each case identify whether this is qualitative or quantitative data, subjective or objective in nature, and explain one advantage and one disadvantage of each technique.

	Type of Data Collection	Qualitative or Quantitative	Subjective or Objective	Advantage	Disadvantage

	Type of Data Collection	Qualitative or Quantitative	Subjective or Objective	Advantage	Disadvantage
					

Data presentation

The next step in the scientific research method after data has been collected by the researcher is to sort and summarise the data in preparation for analysis.

VISUAL REPRESENTATIONS OF QUANTITATIVE DATA

SORTING DATA

An easy way to organise data is through a **frequency distribution table**.

The raw data is summarised into groups or categories. Consider the following raw data which represents the number of hours slept in a week by 25 participants in a sleep study.

Listened to white noise while sleeping

27.75, 39.75, 42, 47, 47, 50, 50, 50.35, 50.75, 51.5, 53.5, 53.5, 54.25, 55.75, 57, 57.75, 58.25, 58.55, 60.5, 60.5

Did not listen to white noise while sleeping

41.24, 41.75, 45.75, 47.5, 48.25, 50.5, 51.25, 52.25, 52.25, 55.25, 58, 58, 59.75, 60.75, 69

Table 6.4.1: Raw Data, hours of sleep per week.

Table 6.4.4: Frequency Distribution Table of number of participants and hours slept per week.

Hours of sleep / week	Number of participants White Noise	Number of participants No White Noise
20.1 - 30	1	0
30.1 - 40	1	0
40.1 – 50	5	5
50.1 - 60	11	8
60.1 +	2	2
Total #n	**20**	**15**

Presenting statistics – statistics such as mean, median, mode, percentages and standard deviation may be calculated to summarise the data – refer to Descriptive statistics in the next section. Statistics may also be presented in a table.

Significant figures – data should be presented to two significant figures.

Table 6.4.5: presenting a summary of mean scores and the difference between them.

	Mean hours of sleep
Listened to white noise	54.45
Did not listen to white noise	53.59
Difference in mean scores	.86

GRAPHING DATA

A graph enables data to be presented visually, and allows researchers, and the end users of the research to be able to quickly and easily see the difference between the variables in order to draw conclusions that relate to the hypothesis.

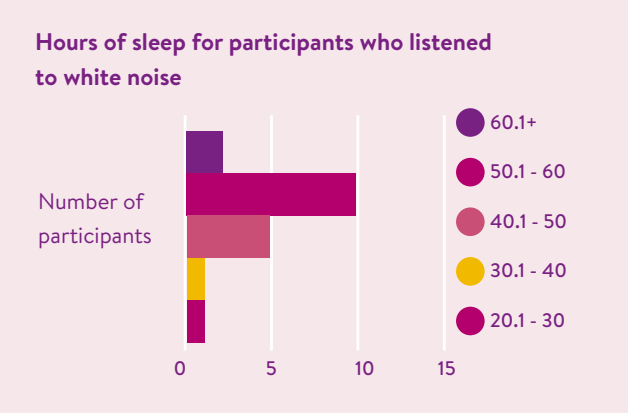


Figure 6.4.5: A histogram displays data on a continuum.

HISTOGRAM

A histogram is used when there is a continuous interval, such as hours of sleep, shoe size, height or weight. A histogram has each of its bars touching to represent that the data is continuous.

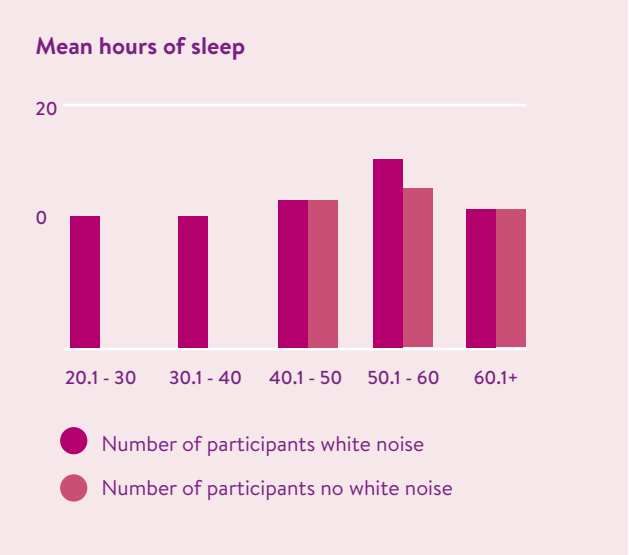


Figure 6.4.6: Bar graphs are presented horizontally as per Figure 6.4.5. Column graphs are presented vertically as per below.

BAR GRAPHS / COLUMN GRAPHS

These graphs are appropriate for comparing different experimental groups and are also useful if the independent variable is not numerical.

Difference between bar graphs and histograms

Basis for comparison	Histogram	Bar Graph
Meaning	Histogram refers to a graphical representation, that displays data by way of bars to show the frequency of numerical data	Bar graph is a pictorial representation of data that uses bars to compare different categories of data
Indicates	Distribution of non-discrete variables	Comparison of discrete variables
Presents	Quantitative data	Categorical data
Spaces	Bars touch each other, hence there are no spaces between bars	Bars do not touch each other, hence there are spaces between bars
Elements	Elements are grouped together, so that they are considered ranges	Elements are taken as individual entities

LINE GRAPHS

Show the relationship between the independent and dependent variables when both are numerical and when the dependent variable is a function of the independent variable.

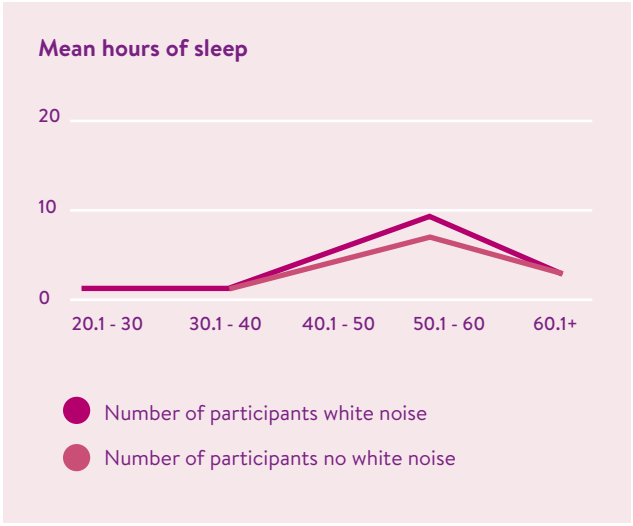


Figure 6.4.7: A line graph connects data points and is most useful when the data is sorted from smallest to largest.

PIE CHART

A pie chart shows the data as a proportion of the total data. In this case, the % of hours of sleep for each subgroup in comparison to the total. This graph makes it clear that the majority of people slept between 50.1-60 hours per week.

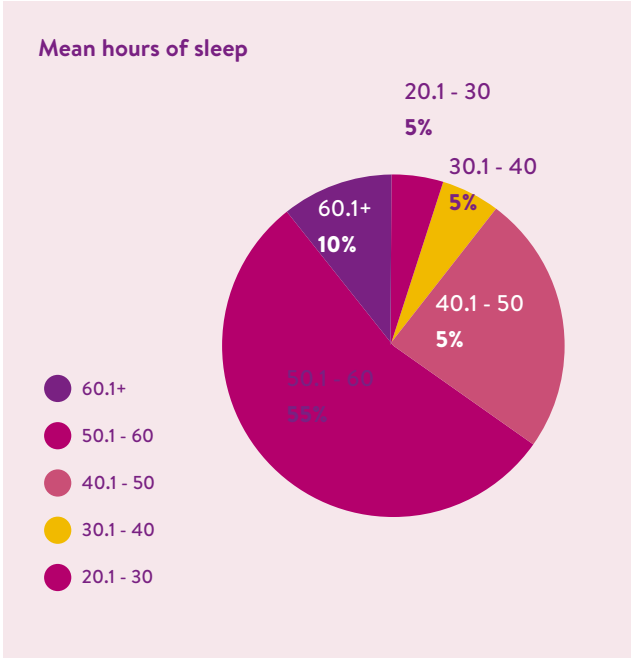
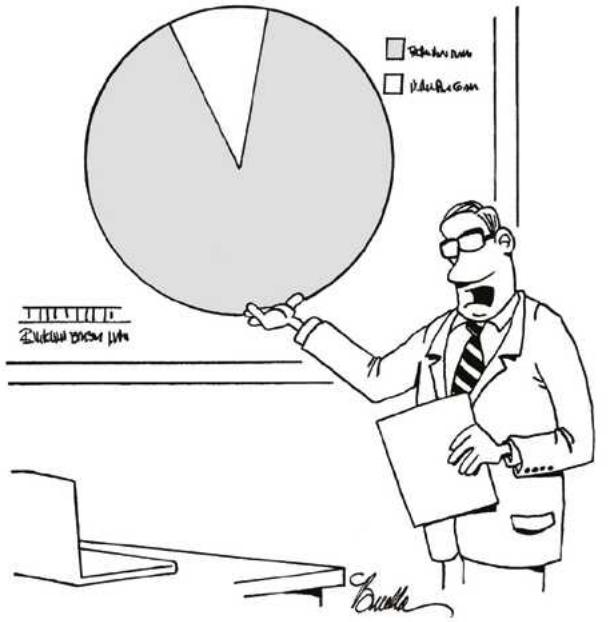


Figure 6.4.8: A pie graph is useful for showing data as a percentage of the whole.



"...and this chart shows people clearly prefer bar graphs over pie charts."

CHECK LIST FOR GRAPHING

1. Select the appropriate graph type (clarify if a bar, column, histogram or line graph is more appropriate and why).
2. Use a descriptive title for each graph.
3. **Label** the axes correctly and specify the units of measurement (ensuring that the units are maintained using the original measure. For example, if heart rate is recorded in BPM using whole numbers, then whole numbers should be graphed and not decimal places)
4. Place the independent variable on the x-axis and the dependent variable on the y-axis.
5. Use the correct scale (the appropriate min and max values on the axes according to the data collected).
6. Plot data correctly and clearly.

SCATTER PLOTS

A scatter plot shows how two separately measured variables relate to one another, or how strongly correlated they are. A trend line indicates the direction and strength of the correlation.

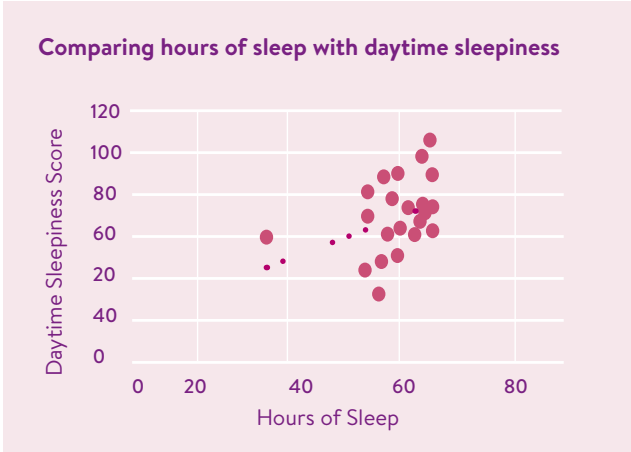


Figure 6.4.9: A scatter plot is used to show a correlation between two related variables.

Visual representations of Qualitative data

CONTENT ANALYSIS

Content analysis is used to organise qualitative data into themes.

Content analysis of responses in focus groups

Researchers follow the following steps to organise the data gathered from focus groups.

1. *Organise the data* become familiar with the data, read and re-read.
2. *Identify core themes* identify groups of comments that are similar.
3. *Code themes* – develop a name that identifies each theme.
4. *Keep track of themes* – note themes that are recurring and whether they were the first comment made or in response to another comment, look at agreements, disagreements, contradictions, different ways of saying the same things.
5. *Analysis* – summarise the analysis using a frequency table with illustrative quotes

Themes	Frequency of themes	Examples from participants
Emotions when tired	6 4 3	Grumpy Angry moody
Behaviours	3 4	Lack of concentration Sleep
Times when tired	3 2 2 1	Morning Lunch time After lunch 5 pm

CHECKING FOR UNDERSTANDING IDENTIFYING DATA FROM DIFFERENT SOURCES

A psychologist conducted an investigation into the effect of listening to music on school children's performance on concentration tests. He goes to his local high school and surveys 20 year 10 students. He divides the students into two groups, where one group listens to music while they complete a basic concentration test, and the control group do not listen to music.

The concentration test required participants to memorise a list of ten words and then tests the number they could remember after a period of time. The experimental group listened to music while both completing both the memory task and the test.

The psychologist gained the following results for the concentration test. The maximum score is 10 and the minimum is 0. The higher the score the greater the concentration.

Group A: Did listen to music	Group B: Did not listen to music
8, 6, 5, 6, 7, 8, 5, 6, 7, 9	5, 4, 6, 7, 5, 3, 5, 3, 5, 3

Complete the frequency distribution table to organise the data.

Concentration Score	Group A: Did listen to music	Group B: Did not listen to music

The average heart rates for the two groups are shown in the table.

Condition	Average Concentration Test score
Group A: Did not listen to music	6.7
Group B: Did listen to music	4.7

CHECKING FOR UNDERSTANDING: CONTENT ANALYSIS

23 participants took part in a focus group to provide insight to the following prompt:
What are students' perceptions of the role of technology in their learning experience, and how do they use digital tools to support their learning?
Use the following information that was gathered from the focus group to conduct content analysis.

"I rely heavily on online resources like Khan Academy and YouTube videos to supplement my classroom learning." (X14)

"I find that taking notes on my laptop helps me stay organized and retain information better than using a pen and paper." (X19)

"I use study apps like Quizlet to create flashcards and practice quizzes to help me prepare for exams." (X17)

"I appreciate when teachers use online platforms like Google classroom or Trove to post course materials and communicate with students." (X23)

"I often use Google Docs or other collaboration tools to work on group projects with classmates who aren't physically in the same location as me." (X7)

"I find that technology can be distracting during class, especially when other students are using their phones or laptops for non-academic purposes." (X5)

"I worry that relying too much on technology could lead to a loss of essential skills like critical thinking and problem-solving." (X1)

"I appreciate when teachers use multimedia resources like videos and interactive simulations to help explain complex concepts." (X13)

"I often use social media platforms like Twitter or Instagram to connect with other students in my classes and get additional insights or resources." (X4)

"I think it's important for teachers to be knowledge-able about the latest technology tools and trends, so that they can effectively incorporate them into their teaching and help prepare us for the workforce." (X9)

Theme	Response	Frequency

Procedure:

	Step	Justification
1		
2		
3		
4		
5		

Proposed Tables and Graphs of Results: Create the tables that you will use to present your data

Create a graph of 'dummy' data to demonstrate how your data will be presented.

Once the researcher collected the data, they decided to conduct further research using an Experimental design. Complete a Deconstruct and Design on the following research question:
"Does the use of digital tools and resources improve student learning outcomes?

What is the independent and dependent variables?

Research Design Options:
Experimental or Observation? Define and explain your reasoning.

Data Type:
Objective or Subjective? Qualitative or Quantitative? Define and explain your reasoning.

Participant Extraneous Variables:

Environmental Extraneous Variables:

Measurement Tools and Justification:

Data Analysis Techniques:

Identify the Population and the Sample, as well as an explanation of sampling methods.

Does the use of digital tools improve student learning outcomes?

Ethical Considerations:
Define and explain each ethical guideline to be considered.

Experimenter Extraneous Variables:

Independent Variable, Dependent Variable and Hypothesis.

SIS 5 EFFECTIVE SCIENTIFIC COMMUNICATION

Effective scientific communication is clear, concise and credible.

- **Communicate to specific audiences and for specific purposes using:**
  - **appropriate language**
  - **terminology**
  - **conventions including appropriate acknowledgement of sources of information**
  - **cultural deftness.**
- **Describing the conventions used in scientific articles.**

2023 Subject Outline | Stage 1

Information presented in scientific reports must be clear, concise, well-articulated and credible. Thorough and successfully scientific practice emerges from strong conceptual understanding of the underlying psychological concepts, but also the ability to communicate effectively in multiple forms with an investigation report. The different forms of communication include communicating clearly in written prose, through data analysis and presentation, explanation of statistics, and through accurate graphs.

The first step achieving this is to ensure the general layout and headings of a scientific report are followed.

Scientific reports need to be tailored to specific audiences, and for specific purposes. Depending on whether the results of a study are being published in a scientific research journal, are being shared in a magazine, news article, blog or in a scientific poster at University, infographic or school report, appropriate language, terminology, acknowledgement of sources and awareness of appropriate cultural implications is important.

Scientific communication should:

- Demonstrate a good understanding of the psychological concepts being discussed
- Use correct grammar in extended written prose
- Use complete sentences
- Use correct spelling

Figure 6.5.1: Research conducted by University students is often presented in a large poster format and shared at research conventions.

- Use short and clear sentences the convey the information required.
- Be able to be understood by someone with little background knowledge of the subject.
- Use technical terms correctly.
- Use formal scientific language.
- Avoid the use of personal pronouns, emotive words and ambiguous expressions.

Conventions used in scientific reports and articles

Scientific information should be communicated according to accepted **scientific conventions**. These **conventions** include significant figures, formulae, units, and data (graphs, diagrams, tables).

Children's Awareness of Task Distraction and Task Persistence

Asma Qaiyumi, Aman Sajid, Cassandra L. Simons, and Susan Sonnenschein

Introduction

- Children's abilities to ignore distractions and persist on tasks, by using learning strategies, predict academic performance (Diamond, 2007; Ghiasvand, 2010).
- Several studies have used checklists to ask children which strategies they use to ignore distractions and persist on learning tasks (Meltzer, 2010).
- However, few studies have asked children to define avoiding distractions and persistence in their own words.
- Knowing how children's definitions compare to researchers' definitions is important because children's awareness of learning strategies predicts their academic performance (Meltzer, 2007).
- Studies of metacognition, or 'thinking about thinking', show that children's understanding of their cognition may be limited, especially at young ages (Flavel, 1979).

The Current Study

- This study had two overarching goals:
- (1) to identify and categorize children's self-reported barriers to ignoring distractions and persisting on tasks
- (2) to compare children's definitions of ignoring distractions and persistence to researcher/expert definitions
  - (2a) to observe developmental differences between grade levels

Method

Participants

- N =113, White (58.6%); Black (19.8%), Hispanic (1.8%); Asian/Pacific Islander (7.1%); Other (12.4%)
- 54% boys and 46% girls, from grades 1-6.
- Grade 1: 19.5%; Grade 2: 25.7%; Grade 3: 17.7%; Grade 4: 14.2%; Grade 5: 12.4%; Grade 6: 10.6

Procedure

- Children completed a questionnaire asking about learning strategies children use to complete tasks.
- Responses were coded for barriers to strategy use and the extent to which child definitions of learning strategies aligned with researcher definitions.

Measures

Children's Knowledge of How They Learn Questionnaire: Measured children's knowledge of learning strategies

Knowledge of Learning Strategies

- *What kinds of things distract you when you are learning something new?*
- *What are some things that make it hard to keep working on an activity until you are finished?*
- *What do you do to help you ignore distractions (not let them bother you)?*
- *What do you do to help yourself keep working on an activity until you are finished?*

Common Barriers to Ignoring Distractions

Common distractions (identified by children):

- Visual distractions (posters, chalkboard, seeing other classmates fooling around)
- Audio distractions (classroom noise)
- Physical contact (classmates touching them)
- Internal distractions (spacing out, thinking about irrelevant topics)

Common Barriers to Persistence

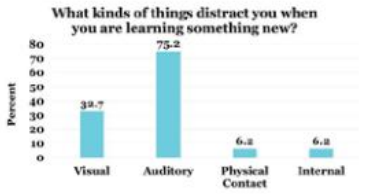
Common barriers to persistence:

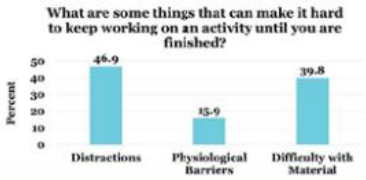
- General distractions (sitting next to friends, classmates talking, classroom posters)
- Physiological barriers (hand starts hurting while writing, feeling tired)
- Difficulty with material (hard problems, not knowing what to do)

Researcher Definitions of Ignoring Distractions & Persisting

Results

Common Barriers to Strategy Use (Child identified)

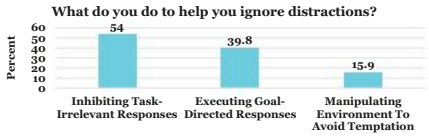




URCAD (2016), Baltimore, MD
Contact: aqaiyu2@umbc.edu, aman7@umbc.edu

Results Continued

Child vs. Researcher Definitions of Learning Strategies



Grade Level Differences

Strategy	1st	2nd	3rd	4th	5th	6th
Inhibiting task-irrelevant responses	54.5%	44.8%	50%	68.8%	64.3%	50%
Executing goal-directed responses	31.8%	37.9%	55%	37.5%	42.9%	33.3%
Manipulating environment to avoid temptation	4.5%	6.9%	15%	37.5%	14.3%	33.3%

Strategy	1st	2nd	3rd	4th	5th	6th
Reflection on Task	0%	6.9%	5%	6.3%	0%	8.3%
Overcoming Obstacles	40.9%	37.9%	25%	37.5%	14.3%	0%
Motivation	9.1%	6.9%	15%	10%	14.3%	50%
Continuance	18.2%	24.1%	10%	37.5%	21.4%	25%

Older children* mentioned manipulating the environment to help them ignore distractions significantly more (M = .29, SE = .06) than younger children (M = .09, SE = .04), $F(1, 111) = 8.43$, p = .004

In general, older children provided more accurate definitions of ignoring distractions (M = .43, SE = .03) than younger children (M = .33, SE = .03), $F(1, 111) = 6.04$, p = .015

Note. *Younger children = grades 1-3, Older children = grades 4-6

Discussion

- In terms of barriers to ignoring distractions and persisting, children most often referenced auditory and visual distractions as well as difficulty with material.
- Comparisons of child vs. researcher definitions showed that children were not aware of all of the aspects of ignoring distractions and persisting that have been identified by researchers.
- Older children were aware of more aspects of ignoring distractions and persistence than younger children.
- This shows that there are developmental differences in children's awareness of learning strategies.
- School curriculum should include lessons on awareness of learning strategies and should emphasize proper use of strategies to ignore distractions and to foster academic success.

Figure 6.5.2: One example of presenting scientific research in a professional poster format for sharing with colleagues.

HELPFUL ONLINE RESOURCES

A short guide on Scientific Writing:
https://tinyurl.com/5xj7sryy

Conventions of science writing:
https://tinyurl.com/2knw8hrj

Critically evaluate and acknowledge sources

In the study of Psychology, students are required to critically evaluate and acknowledge sources. The SACE Board of South Australia provides extensive guidelines for both these topics. To access these resources and ensure that you comply with all ethical guidelines, please access the SACE Website below.
https://tinyurl.com/d7m7ajyk

South Australian Certificate of Education

SIS 6 USING STATISTICS TO ANALYSE TRENDS, PATTERNS AND CORRELATIONS

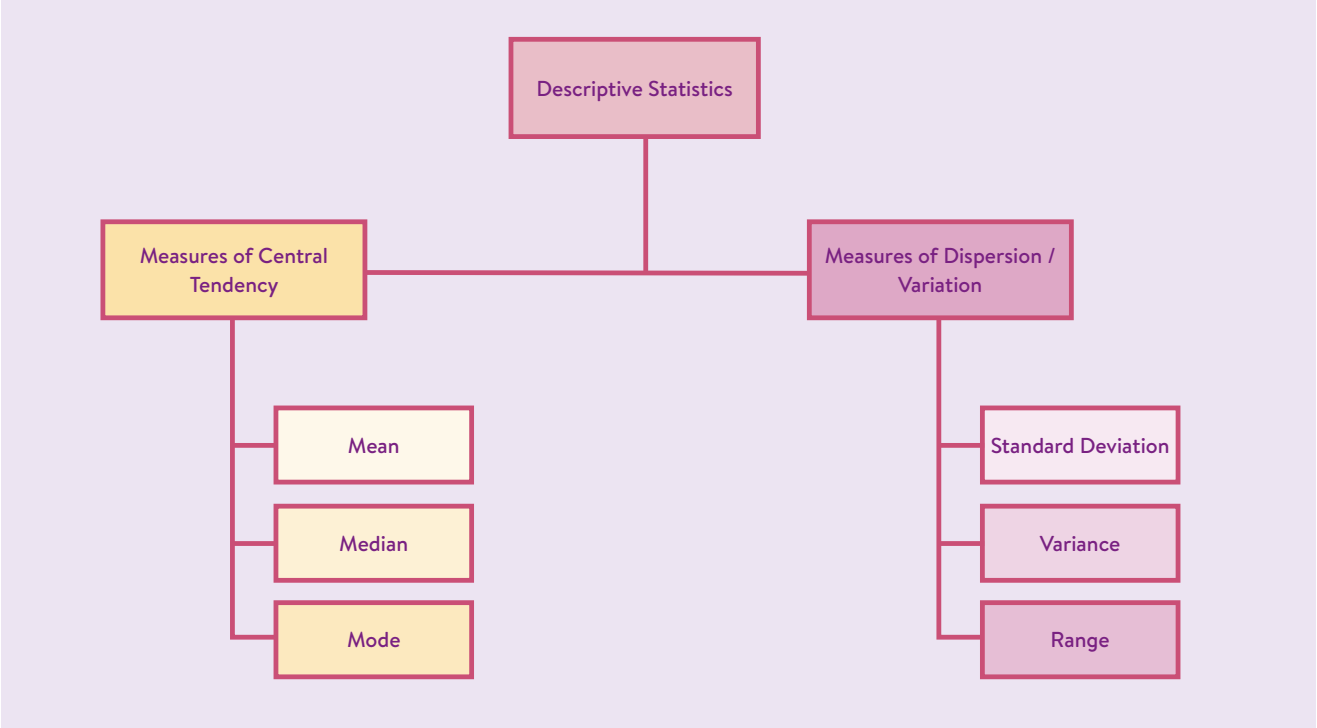
Analysis of the results of investigations allows them to be interpreted in a meaningful way.

- Analyse data, including:
  - identification and discussion of trends, patterns, and correlations
  - the appropriate use of descriptive statistics (means, medians, standard deviations)
  - calculations of mean and median for quantitative data sets.

2023 Subject Outline | Stage 1

Descriptive Statistics

In this section we will look at the ways in which data gathered from psychological research is presented and interpreted. **Descriptive Statistics** allow the researcher to organise and describe data from **Quantitative designs** using a simple value representing the data set. This assists in the ability to identify patterns or trends in a data set which enables conclusions to be made regarding research findings.



MEASURES OF CENTRAL TENDENCY

Measures of central tendency provide information on the central value and distribution of a data set and includes the mean, mode and median. Dispersion is the degree to which data is distributed around Central tendency, and is represented by range, deviation, variance, standard deviation.

MEAN

Is calculated by adding all the values in the data set together, then dividing by the number of data sets. This is often referred to as the average.

Strengths: It makes use of all the data. (see example below)

Weakness: It is not representative when extreme values exist in the data. Susceptible to the influence of outliers.

MODE

Is the most frequently occuring value in the data. It is often the highest bar when represented on a histogram.

Strengths: Useful when data invloved categories

Weakness: General not used in Psychological data unless representing category based data. Not useful if there is more than 1 mode occurring in a data set. It does not tell us anything about the other values.

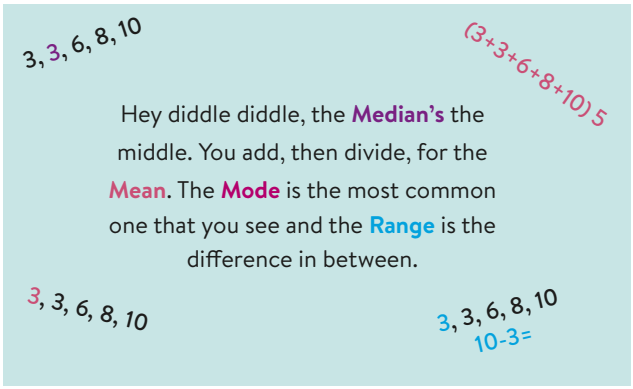
MEDIAN

Is the middle value in a data set when the data has been ordered from the smallest to largest value.

Note: If the list includes an even number of values, the median is the arithmetic average of the middle two numbers.

Strengths: Is not affected by extreme scores (outliers). It can also be used with skewed data.

Weakness: It is less useful when there is a small or large amount of data.



Working out the measure of central tendency:

Mean

11,12,9,7,26,8,9,

11+12+9+7+26+8+9= 82

82/7 = 11.6

Mode: 9

Median= 7,8,9,9,11,12,26 (most central data point)

Figure 6.6.1: A helpful rhyme to remember the Median, Mean, Mode and Range.

CHECKING FOR UNDERSTANDING
FIND THE MEAN, MEDIAN AND MODE OF THIS DATA

Scores from a mathematics test given to 18 students,

Q1: 41, 39, 48, 52, 46, 62, 54, 40, 96, 52, 98, 40, 42, 52 60, 25, 22, 74

Mean: .... Mode: ... . Median: . .. .

Q2: Reaction times to the nearest second have been recorded as follows.
14, 25, 14, 28, 18, 17, 18, 14, 23, 22, 14, 18.

Mean: .... Mode: ... . Median: . .. .

Q3: The heights (in cm) of 12 students of a class are as follows:
155, 160, 145, 149, 150, 147, 152, 144, 148, 144, 173, 160

Mean: .... Mode: ... . Median: . .. .

GRAPHICAL REPRESENTATION

Measures of central tendency are often presented in frequency polygons displaying a bell curve where there is a normal distribution of data. (See Figure 6.5.2). The curve is symmetrical, and the mean, median, and mode fall at the highest point on the curve. Many everyday data sets follow the normal distribution and can be presented in a histogram such as, height and weight, marks on a test, blood pressure amongst many.

- mean = median = mode
- symmetry about the centre
- 50% of values less than the mean and 50% greater than the mean

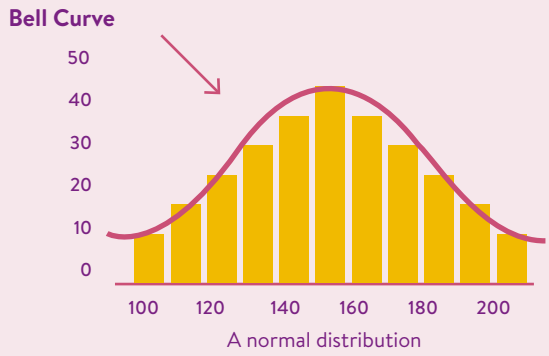


Figure 6.6.2: A Normal Distribution shows 50% of data above the mean, and 50% of data below the mean, in a bell-shaped curve.

Whilst much data falls under a normal distribution, some data sets are skewed. This means data will be grouped towards one end with the mean, median and mode falling at different points. Unlike a normal distribution, skewed distributions are asymmetrical. Distributions skewed to the left are **negatively skewed** (see diagram a) with distributions falling to the right being **positively skewed** (see diagram c). Skewed data essentially tells us the probability of occurrence that random variables deviate from the normal distribution.

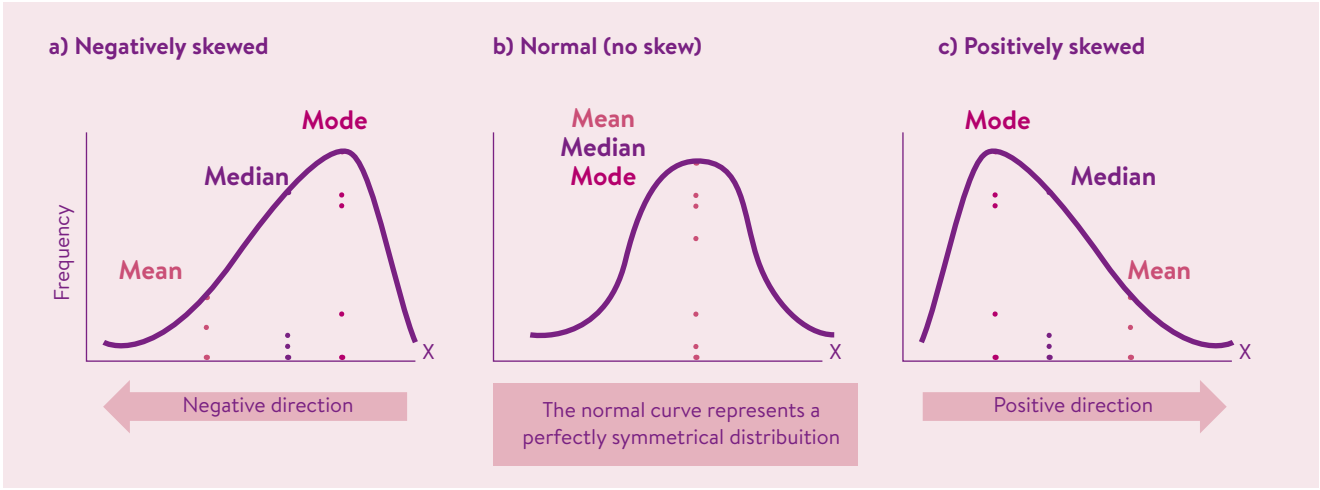
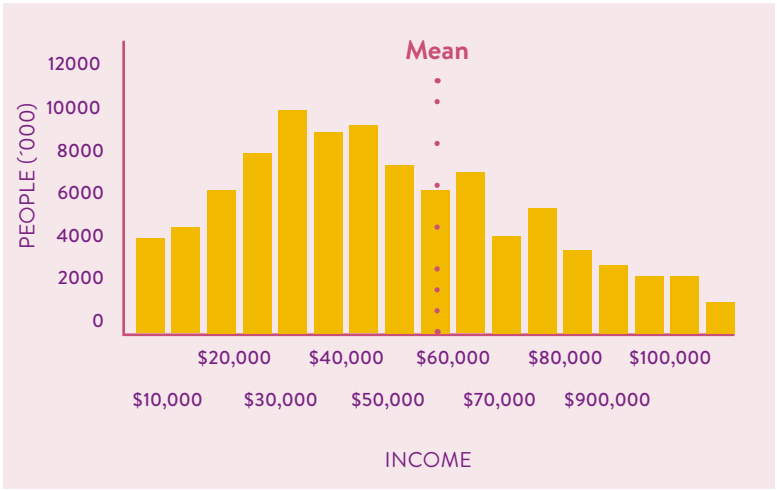


Figure 6.6.3: The skew is described by the "tail" of the graph. The graph on the left is a negatively skewed graph, as the part of the graph that has a wide range of data is skewed to the negative (or lower) numbers on the X axis. The graph on the right is positively skewed, as the data with a wide range is skewed to the positive (or higher) numbers on the X axis.

Have you searched for mean salary when considering your future career prospects? Mean salaries often provide a great example of skewed data. The diagram below shows us the mean income in Australia. The data is skewed to the right which causes the mean to be greater than the median and mode.



The median is resistant to outliers because it is locating the exact centre, or middle of the data distribution.

Since outliers and/or strong skewness affect mean and standard deviation, mean and standard deviation should not be used to describe a skewed distribution or a distribution with outliers.

Figure 6.6.4: Mean income in Australia is positively skewed, as there is a greater variation in the incomes of people earning over $55,000 (the mean income). The mode in this diagram shows that the most frequent income is $30,000.

Follow this link to the Australian Bureau of statistics for accurate data about median income in Australia.
https://tinyurl.com/8f5h6md4

MEASURES OF DISPERSION

Measures of dispersion enable us to examine the variability of data from the mean within a data set. There are three widely used measures of variability, namely the range, variance and **standard deviation (SD)**. (Note you will not be required to calculate these values but you may be required to interpret the SD in a data set).

The **range** describes the spread of scores in a distribution and is calculated by subtracting the lowest from the highest score in the distribution.

The individual hours of study reported by Psychology students are: 4, 3, 6, 10. The range is 10 – 3 = **7**

CHECKING FOR UNDERSTANDING

Calculate the range for this dataset:
94, 88, 75, 87, 79, 88, 65, 91

Range=

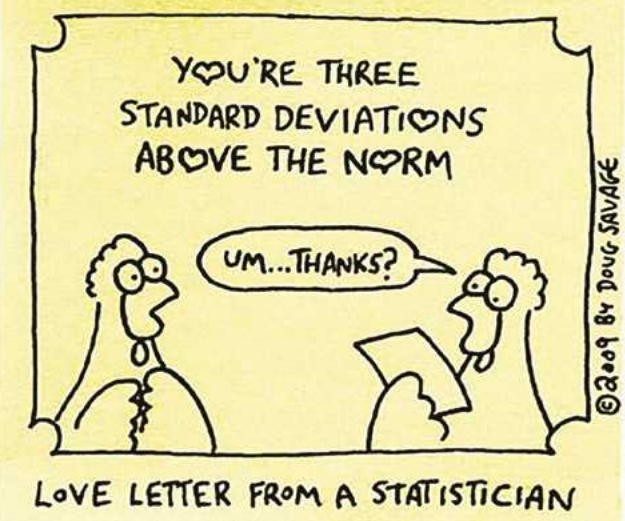
Most research data is made up of measures or values where there is some variability. Low variability indicates scores are packed tightly around the mean with high variability indicating scores are more widely spread around the mean.

STANDARD DEVIATION

Standard deviation is a measure which tells us how dispersed (spread) the scores are around the mean in any data set. A small standard deviation means little variability while a large standard deviation means high variability (see Figure 6.5.5). Standard deviation helps researchers to decide if data is statistically significant or falls within the expected variation.

Standard deviation is one of two main factors contributing to the **reliability** of the population mean. This **reliability** is often quantified as the standard error (SE) of the mean. Standard error is also inversely proportional to the **sample size**; the larger the **sample size**, the smaller the standard error due to the proximity to the actual value.

In a Normal distribution, 68% of all values are within one standard deviation, therefore approximately (68%) of scores will lie within one SD to either side of the mean when data is gathered from a representative sample of the target population. This indicates that most data reported will lie within one



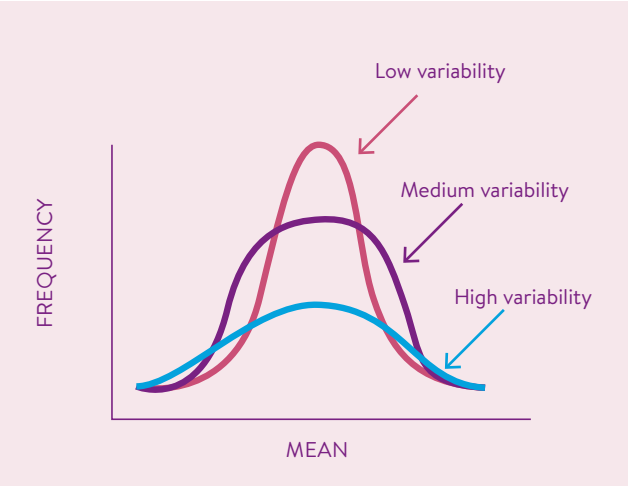


Figure 6.6.5: A normal distribution of data, but shown with low, medium and high variability.

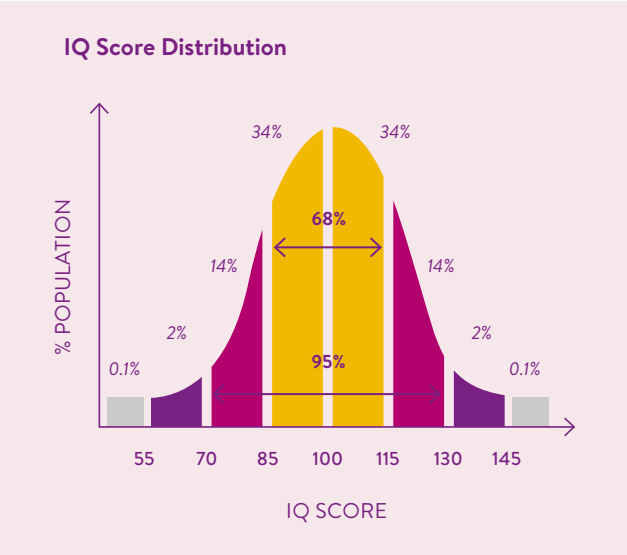


Figure 6.6.7: A normal distribution showing the dispersion ± 3SD from the mean.

SD of the mean, 95.44 % will lie within two standard deviations, and 99.7% of all values lying within three standard deviations. **This does not apply to small sample sizes**. Therefore, it is unlikely that results collected from Stage 1 or 2 Psychology investigations will fall into the expected SD due to the limited sample as the sample is not representative of the whole population.

In general, a larger SD means there is greater variance of data from the mean, thus the results are not as reliable compared to those with a smaller SD. Statisticians have agreed that data should be no more than ± 2SD to be considered reliable.

HELPFUL ONLINE RESOURCES

Standard deviation
Here is a short video clip to explain the key concepts of standard deviation:
https://tinyurl.com/tzssczn

Tip: You will not be required to calculate SD in the Psychology exam. Your knowledge and understanding will be tested by your ability to explain what a data set is showing in terms of the standard deviation.

Let's look at an example.
22 Psychology students are tested where the maximum score is 60.

	Class 1 scores	Class 2 scores
	46	43
	48	55
	47	60
	48	55
	50	60
	51	42
	52	44
	38	57
	40	32
	41	54
	44	52
	46	41
	46	41
	48	40
	56	33
	52	41
	54	54
	48	57
	47	44
	44	59
Total	920	964
Mean	46	48.2
SD	4.66	9.16

This tells us that class 2 had a larger spread of scores around the mean compared to group 1, indicating that group 1 data is more reliable than group 2.

CHECKING FOR UNDERSTANDING

Psychologists were interested in exploring the relationship between time spent on social media and hours of sleep. Participants were placed in two groups (A and B), depending on how much time they spent on social media. The Epworth Sleepiness Scale (ESS) was used to measure the level of sleepiness of participants over 2 weeks. The mean and standard deviation (SD) for each group is provided below. Higher mean scores indicate higher levels of sleepiness

	Weekly recorded hours spent on social media	ESS	SD
Group A	**< 10**	**13**	**7**
Group B	**> 10**	**17**	**4**

Discuss what the standard deviations tells us about the results from this study.

IDENTIFYING TRENDS, PATTERNS AND CORRELATIONS IN DATA

Did you know that when there is an increase of murder in New York city there is also an increase in ice-cream sales? (Rumsey, 2021). Likewise, when the number of ice-cream sales increase, so do the number of shark attacks. (see Figure 6.5.9). This does not mean the sharks are responsible for an increase in ice-cream sales nor is the ice-cream vendor responsible for an increase in shark attacks. A more likely explanation is that when it gets warmer more people go to the beach and with more people in the water it increases the possibility of a shark attack to occur. Likewise, people at the beach on a warm day often purchase ice-cream but the vendor is not responsible for the increasing shark attacks. This concept is referred to as a **correlation** and tells us of the **relationship** between two variables.

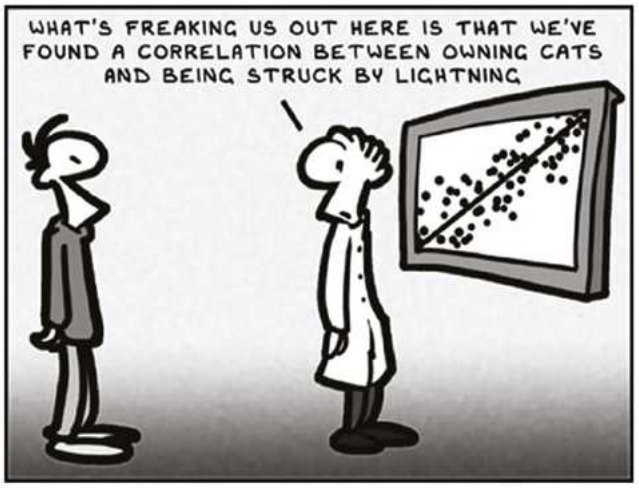


Figure 6.6.8: A humorous example of data showing an unlikely positive correlation between owning a cat and being struck by lightning.

What the data cannot tell us is why or how the relationship between the two variables exist, only that it does. Unlike experimental data, correlational data does NOT imply a cause-and-effect relationship between the variables.

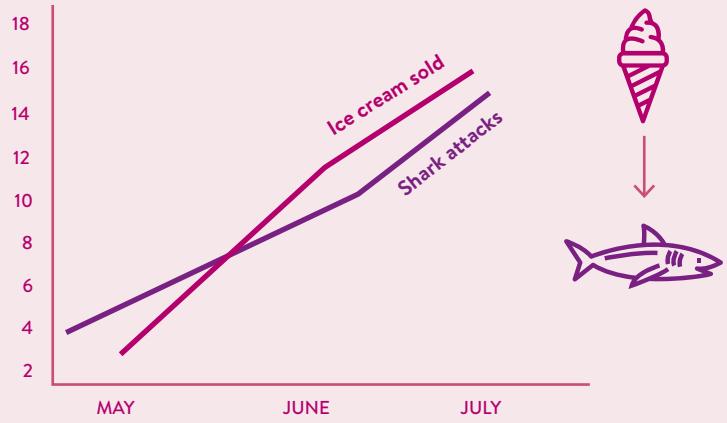


Figure 6.6.9: A correlation graph showing that when the number of ice-cream sales increase, so do the number of shark attacks.

Once data has been collated and displayed in the appropriate presentations, researchers are able to identify trends in the data set. Correlational data is generally presented on a scatterplot which you looked at in the previous section of this chapter. Scatterplots provide a graphical representation of the strength and direction of correlations if any exist. Have a look at the scatterplot graphs below.

Revision time and test scores

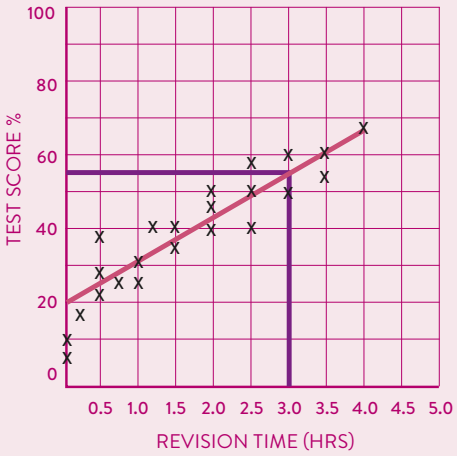


Figure 1: Positive correlation

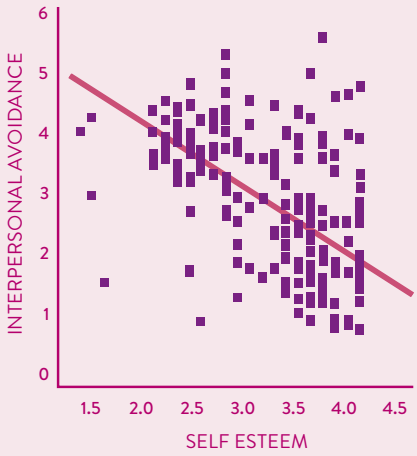


Figure 2: Negative correlation

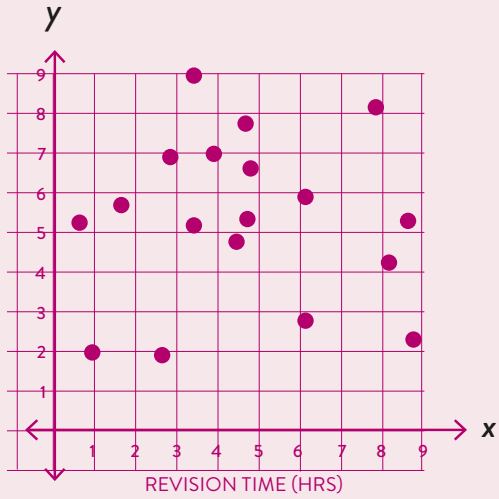


Figure 3: No correlation

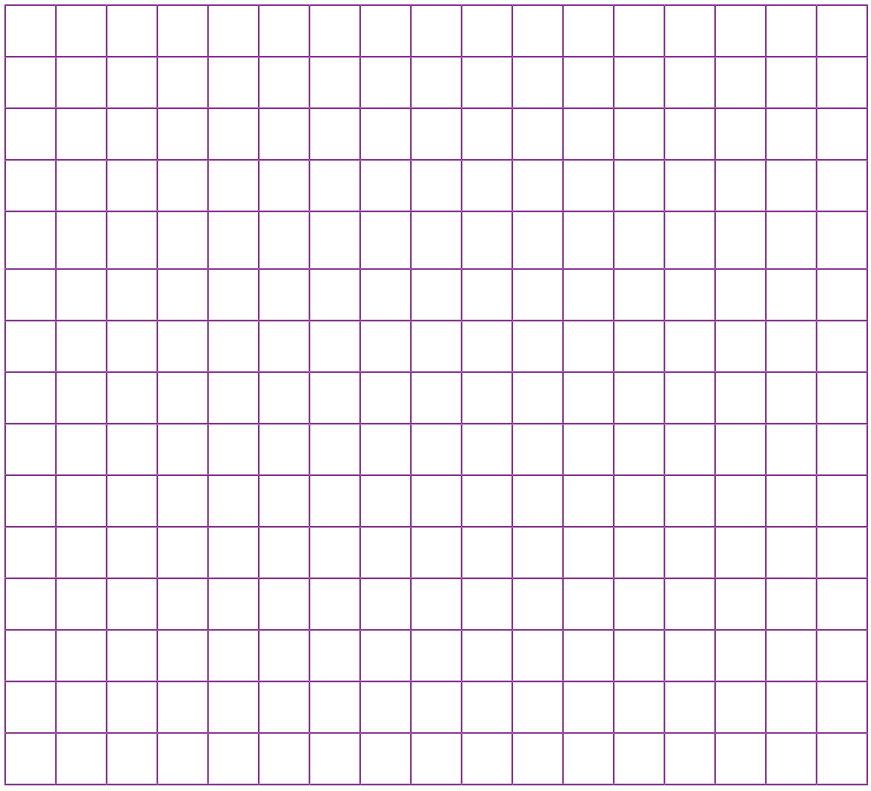
A **positive correlation** shows that as one variable increases, so does the other whereas a **negative correlation** shows that as one variable increases, the other decreases.

- Figure 1 shows that students with higher revision times had higher test scores compared to students with lower revision times and lower test scores. This is showing that there is a positive relationship between both variables.
- Figure 2 shows that people with higher levels of avoidance behaviours also had lower self-esteem. This is showing a negative relationship between the two variables but there is still a relationship of some sort existing.
- In comparison figure 3 shows that there is no relationship between gender and success in Psychology exam performance. Therefore, determining gender is not a contributing factor in the student's success.

CHECKING FOR UNDERSTANDING: PLOTTING DATA ON A SCATTERPLOT

A teacher wanted to know whether the performance in a test was linked to the distance the student travelled to school. The teacher obtained the following results:

Distance (km)	Test Score
0.1	37
0.1	74
0.2	22
0.3	70
0.5	65
0.5	56
0.8	64
1.2	41
1.4	39
1.7	48
1.7	67
1.8	53
2.3	44
2.4	35
3.0	42
6.4	66



Plot the data and determine if there is a correlation between the distance travelled to school and test scores.

Correlation: .. .. .

Note: Related information but not required knowledge for SACE, - the strength of a relationship between variables is known as the correlation coefficient. There are several statistical formulas to calculate the coefficient demonstrating strength: a value of 1 indicates a strong positive relationship with -1 indicating a strong negative relationship. 0 indicating that no relationship exists between the two variables.

SIS 7 CRITICAL EVALUATION OF PROCEDURES AND DATA

Critical evaluation of procedures and data can determine the meaningfulness of the results.

- Identify sources of uncertainty, such as confounding and extraneous variables
- Evaluate the reliability and validity of data.
- Discuss how the following could affect the data obtained in an investigation:
  - sample size
  - representativeness of sample

2023 Subject Outline | Stage 1

It is important for researchers to consider sources of uncertainty prior to accepting or rejecting the hypothesis, and it is the responsibility of the researcher to make sure that the methods that they have been using to conduct the research, are **valid** and **reliable**, and have eliminated as many **extraneous variables** as possible. If, at the end of the research, there are issues found through a critical evaluation of the procedures and data, the researcher needs to identify these issues as **confounding variables** and determine the extent to which they impact the conclusion of the research.

STUDY FINDS THE LESS YOU SLEEP, THE LESS PEOPLE LIKE YOU

A new study reveals people don't want to socialise with a sleep deprived person.

It turns out, the concept of beauty sleep is not just clever marketing from cosmetics makers. According to a recent study published in the Royal Society Open Science Journal, not getting enough sleep makes you less attractive, less healthy and damages your social appeal.

The study discovered that sleep deprivation and looking tired not only have a direct relationship to health and attractiveness, but people are less likely to interact with someone who looks tired and unhealthy.

Conducted at the Karolinska Institute in Sweden, researchers photographed 25 male and female students without makeup after they had slept for eight hours for two consecutive nights. The researchers took another set of photographs of the students after they restricted their sleep to four hours a night for two consecutive nights.

Researchers presented each student's photographs to a group of 122 strangers who rated each image in terms of attractiveness, health, sleepiness and trustworthiness.

Of course, most people gave lower scores to the people in the sleep-deprived images, labeling them as less attractive and less healthy. Raters admitted to being less inclined to socialise with sleep-deprived individuals, and the study goes so far as to suggest that people might avoid contact with a sleep-deprived person in order to reduce health risks.

According to the study, "Having an unhealthy-looking face, whether due to sleep deprivation or otherwise, might thus activate disease-avoidance mechanisms in others and render one's surroundings less socially inclined."

However, while the study found that people were found to be less attractive when lacking sleep, it discovered no change in other's perception of how trustworthy a person appears.

https://tinyurl.com/5yspwxhe

CONSIDERING THE IMPLICATIONS ON THE DATA

Read the article about sleep on the previous page and consider whether there are any sources of uncertainty that might impact on the data.

Explain how the data might be affected by any confounding variables you identify.

SOURCES OF UNCERTAINTY IN THE PROCEDURES

Sources of uncertainty in research can occur at any step in the research process. Many of these have been highlighted throughout the Science Inquiry Skills topic and include issues that arise from:

Extraneous variables

Are there any participant variables to be considered?

- Are there any situational variables that might impact the data?
- Is the evidence of experimenter effects at play?
- Could the placebo effect interfere with the data?

Research method used

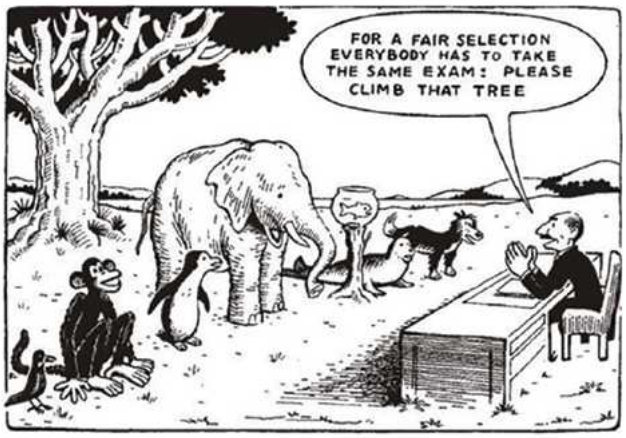
- Was the most appropriate test used?
- Were there flaws or errors in the measuring tool?
- Were the questions / procedures confusing?
- Was there inherent bias in the questions / procedures that favoured one group over the other?
- Was a control group used?

Sample Size

- Was the sample large enough to represent the research population?
- Was the best type of sampling technique used to select the sample?

Sample Representativeness

Do the characteristics of the sample match the characteristics of the population?



Explain the limitations of the sample depicted in the cartoon above.

VALIDITY AND RELIABILITY

In addition to identifying confounding variables, it is important that the researcher evaluates the extent to which the methods they are using to test the impact of the IV on the DV are valid and reliable. If the researcher is unable to be confident that their procedures are valid and reliable, then the data, and ultimate conclusion may produce inaccurate, false or misleading results.

Reliability is a measure of **consistency**, if a particular measurement is repeated and the same result is obtained then it is described as being reliable.

- **Test-retest reliability** – Assessing the same person on two different occasions which shows the extent to which the test produces the same answers. Tests, questionnaires and other measurement tools need to give consistent results over time and items in the test need to be consistent with each other.
- **Inter-observer reliability** – the extent to which there is agreement between two or more observers. The extent to which different observers, scoring the same participants, achieve consistency.

Validity is concerned with the extent to which something **measures** what it sets out to measure.

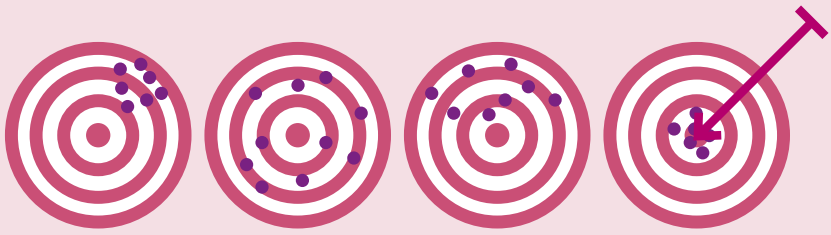
- **Internal validity** is concerned with the extent to which research findings are due to the mechanisms suggested. For instance, are results due to some unwanted variable (e.g., individual differences, effects of practice, researcher effects, demand characteristics) rather than the IV? Internal validity is also compromised if no effect is found when in fact an effect actually exists.
- **External validity** is the extent to which the results found in research can be generalised to an entire population. Gathering data from an unrepresentative sample increases the likelihood of sampling bias which limits the researcher's ability to make conclusions to the wider population. In this case the results are considered to have low external validity.

An additional challenge in making definitive or generalised conclusions arises where research is completed in a laboratory or any other artificial setting.

- **Ecological validity** is the extent to which results can be generalised to other situations (real life). If the experiment was conducted in a lab, we generally state that the results lack ecological validity due to the low mundane realism (meaning it does not necessarily reflect situations in the real world outside the lab).

Ecological validity is a subtype of external validity.

How is this different from external validity? External validity asks whether the findings of a study can be generalised to participants with characteristics that are different from those in the study, or participants who are treated in a different way. In contrast, ecological validity specifically examines whether the findings of a study can be generalised to naturalistic situations, such as clinical practice in everyday life.



Reliable
Not valid

Low validity
Low reliability

Not reliable
Not valid

Both reliable
and valid

The importance of Internal vs External validity depends on the purpose of the study. If the study is designed to test a theory, high internal validity would be preferred to high external validity. However if the study is designed with the intention of applying the results to the real world, then high external validity is important.

HOW PROFESSIONAL RESEARCHERS OVERCOME LIMITATIONS OF THE RELIABILITY OF A SINGLE FINDING

There are many meta-analyses in psychology and medicine, areas where studies often find conflicting results. For example, some experiments might find that a particular drug decreases the risk of heart attack, while other experiments might find the drug doesn't have any particular effect. A meta-analysis takes the results from all published studies on the same question and combines them; it's as if someone has done a single study with a much larger sample size.

Strengths: Increases the validity of the conclusions drawn as they are based on a wider range.

Weaknesses: Research designs in studies can vary so they are not truly comparable.

LIMITATIONS OF DRAWING CONCLUSIONS USING SMALL OR UNREPRESENTATIVE SAMPLES

With all forms of research it is important that the sample is a **random sample** of the population. In other words every person in the population had an equal chance of being chosen in the sample. If it is not a random sample the experiment or survey may not accurately reflect the population.

Size: larger samples are more likely to reflect the population. A small sample may be biased in terms of factors such as gender, age, socio-economic status or cultural groups, therefore doesn't represent all the key interest groups within a population.

Unrepresentative samples: an unrepresentative sample is a sample which does to represent the population due to its size or that is biased in term of factors such as gender, age, socioeconomic status or cultural groups. An unrepresentative sample can lack **internal validity** which means that it does not test the hypothesis.

Using small or unrepresentative sample doesn't' represent the population therefore it may be inaccurate to generalise results to the wider population.

SCIENCE AS A HUMAN ENDEAVOUR: REAL WORLD APPLICATION

Ecological validity was originally invoked in the context of laboratory studies that required to be generalized to real-life situations. Thus, laboratory studies of the neuropsychological and psychomotor impairments produced by psychotropic drugs have poor ecological validity because what is studied in relaxed, rested, and healthy subjects tested in a controlled environment is very different from demands that stressed patients face in everyday life. In fact, these cognitive and psychomotor tests, especially when based on computerised tasks, have no parallel in everyday life. In this example the external validity is low.

CHECKING FOR UNDERSTANDING

Adapted from:
https://tinyurl.com/mtcx7dbk
New study shows popular smart watches accurately measure rapid heartbeat.

A new study is the first to validate the accuracy of wrist-worn wearable devices in measuring induced paroxysmal supraventricular tachycardia (PSVT), or episodes of rapid heart rate. Three common wearable devices including the Apple Watch Series 2, Samsung Galaxy Gear S3 and the Fitbit Charge 2, were randomly assigned to patients to measure heart rate. Wearable devices are very popular and are now widely used not only to track fitness levels, but to also capture and monitor heart rates with photoplethysmography (PPG) technology. However, few studies are published that evaluate the accuracy of these devices especially in an arrhythmic situation.

The study included 51 patients with a history of PSVT who were scheduled to undergo an electrophysiology study. The mean patient age was 44.4±16.6 years old and 53 percent were male. The study assessed three common wearable technologies, the Apple Watch Series 2 (Apple), Samsung Galaxy Gear S3 (Samsung) and the Fitbit Charge 2 (Fitbit). Patients were randomly assigned to wear two different devices, one on each wrist. The heart rate at baseline and during induced PSVT was evaluated.

The baseline heart rate ranged from 50 beats per minute (bpm) to 101 bpm. The accuracy of the wearables at detecting baseline heart rate within five bpm was 100 percent, 100 percent and 94 percent for Apple, Samsung and Fitbit, respectively. Heart rate during PSVT ranged from 108 bpm to 228 bpm. The accuracy within 10 bpm was 100 percent, 100 percent and 88 percent for Apple, Samsung and Fitbit, respectively. The rate or type of PSVT, age and sex did not influence device accuracy.

	Baseline heartrate range 50 (bpm) to 101 (bpm)	Heartrate during PSVT 180 (bpm) to 228 (bpm)
Apple	100% accuracy	100% accuracy
Samsung	100% accuracy	100% accuracy
Fitbit	94% accuracy	88% accuracy

Critically evaluate the study above with regard to validity and reliability. Suggest future improvements for the researchers.

SIS 8 DRAWING CONCLUSIONS AND MAKING GENERALISATIONS

Conclusions can be formed that relate to the hypothesis or inquiry question.

- Select and use evidence and scientific understanding to make and justify conclusions.
- Explain the limitations of conclusions.
- Explain why the results of some investigations may not lead to definitive conclusions.

2023 Subject Outline | Stage 1

Using evidence and scientific understanding to make and justify conclusions

PUTTING IT ALL TOGETHER!

The main reason for conducting psychological research is to be able to apply what we have learned from a research study to the population of interest. If the results of the study are conclusive, and were useful, beneficial, or demonstrated something for the sample group, then it is logical that the results will be applicable, useful or beneficial to the research population too!

A **conclusion** is a decision or judgement about the results and must circle back to the original hypothesis to determine whether the hypothesis was supported, or not supported. Before making a conclusion, it is helpful to consider the statistical significance of the results (the likelihood that the results were by chance) so that the researcher can be *confident* that the change in the dependent variable *is due to* the independent variable. Psychologists do not say that a hypothesis has been 'proven' or 'disproven', so instead, they conclude that a hypothesis has been *rejected*, or *supported.*

If a conclusion has been reached, and the researcher is confident when they have evaluated their research procedures, and considered the criteria below, then the research findings can be **generalised** to the research population. A researcher can be confident to generalise the findings when:

- Appropriate research design was conducted
- Appropriate sampling techniques were used
- The sample size was appropriate
- The sample was representative of the characteristics of the population
- Participant, Situational, and Experimenter extraneous variables have been controlled.
- Confounding variables have not occurred
- Appropriate measures were used, throughout the research
- The measures used produced valid and reliable results
- Data was presented accurately.
- Data analysis was interpreted accurately, without bias
- All ethical procedures were followed correctly
- The results are significant.

HELPFUL ONLINE RESOURCES

Limitations of a study
For more information about identifying limitations of a research study visit:
https://tinyurl.com/2hhhn7uc

Limitations of conclusions

Conclusions can be limited by any number of the points mentioned above.

When discussing the limitations of your research, be sure to:

- Describe each limitation in detailed but concise terms.
- Explain why each limitation exists.
- Provide the reasons why each limitation could not be overcome using the method(s) chosen to acquire or gather the data [cite to other studies that had similar problems when possible].
- Assess the impact of each limitation in relation to the overall findings and conclusions of your study; and,
- If appropriate, describe how these limitations could point to the need for further research.

CULTURAL CONTEXT

When evaluating the findings of research, it is crucial to consider the cultural context and relevance this has in terms of application beyond the culture of those in the sample.

Ethnocentrism refers to a tendency to use your own culture as the standard by which to judge and evaluate other cultures. It can also make it difficult to see how your own cultural background influences your behaviours. For example, observing behaviour of non-Indigenous Australians in the process of mourning and using this as a template of expectation of how Indigenous Australians or any other cultural group 'should' mourn.

A method of reducing this phenomenon is to conduct cross-cultural research where each varying phenomenon is viewed in its own context and described and interpreted relative to the cultural or ecological situation in which it occurs.

The results of some investigations may not lead to definitive conclusions

It is possible to conclude a **null hypothesis.** A **null hypothesis** states that there is no relationship between the two variables being studied (one variable does not affect the other). It states results are due to chance and are not significant in terms of supporting the idea being investigated.

CHECKING FOR UNDERSTANDING: DRAWING CONCLUSIONS

The Relationship between Social Media and the Increase in Mental Health Problems

Read the following sections of the research link:
https://tinyurl.com/53pt3cdz
Abstract
Introduction
Discussion

Write your own conclusion for the information presented.

Discuss the reliability and validity of the research.

Reliability in psychology is the consistency of the findings or results of a psychology research study. If findings or results remain the same or similar over multiple attempts, a researcher often considers it reliable.

Validity refers to how well a test actually measures what it was created to measure. Reliability measures the precision of a test, while validity looks at accuracy.

HELPFUL ONLINE RESOURCES

https://tinyurl.com/43jynh5v

MULTIPLE CHOICE LEARNING CHECK

1) Which of the following are **unique** characteristics of an experimental design:
   a. Cause- and-effect relationship
   b. Random allocation into groups
   c. Presence of an IV and DV
   d. All of the above

2) Which term identifies limiting the application of the results found in a study to the specific setting it is conducted?
   a. Ecological validity
   b. External validity
   c. Internal Validity
   d. Population validity

3) If a study can be replicated consistently using standardised instructions and finding similar results, it is said to be:
   a. Valid
   b. Consistent
   c. Reliable
   d. Generalised

4) Which of the following are consistent between an Experimental design and Observational designs?
   a. Cause- and-effect relationship
   b. Correlational data
   c. The presence of an IV and DV
   d. All of the above

5) Qualitative data can be obtained from:
   a. Interviews
   b. Focus group
   c. Delphi technique
   d. All of the above

6) What type of data do experiments generate?
   a. Qualitative data
   b. Quantitative data
   c. Subjective data
   d. Content analysis

7) When neither the participant or the experimenter know which group they are assigned to, it is referred to as
   a. Controlled variables
   b. Single blind procedure
   c. Double blind procedure
   d. Deception

8) The process of turning qualitative data into quantitative data is called:
   a. Content analysis
   b. Behavioural counts
   c. Data processing
   d. Behavioural analysis

9) The Delphi technique
   a. Involves small group discussion between 6-8 people on a specific topic
   b. Is a process used to arrive at a group opinion or decision by surveying a panel of experts
   c. Involves the use of a scribe
   d. Produces quantitative data

10) Standard deviation tells us
   a. How likely errors have occurred in a data set
   b. How many outliers occur in the data set
   c. Which measure of dispersion to use
   d. The distribution of scores around the mean

11) The median is a better method of central tendency when:
   a. There are significant outliers in the data.
   b. There are more than 5 pieces of data.
   c. Standard deviation is more than 6
   d. There are an odd number of data sets

12) When much of the data is clustered to the right of the graph, the data is
   a. Normal.
   b. Positively Skewed.
   c. Negatively Skewed.
   d. Bimodal.

13) Internal validity is:
   a. Consistency over trials
   b. The extent to which a study establishes a trustworthy cause-and-effect relationship between the IV and DV
   c. A reflection of the experimenters conducts throughout the investigation
   d. The extent to which the results of research or testing can be generalized beyond the sample that generated them

14) *External validity* is:
   a. The likelihood that results would be found under the different conditions
   b. The likelihood that no extraneous variables compromised the results
   c. The extent to which a study establishes a trustworthy cause-and-effect relationship between the IV and DV
   d. The extent to which the results of research or testing can be generalized beyond the sample that generated them

15) A Likert scale provides
   a. Subjective data
   b. Direction of attitude, opinions, or feelings on a specific phenomenon
   c. Rating scale
   d. All of the above

HELPFUL ONLINE RESOURCES

For more information about communicating effectively with Aboriginal and Torres Strait Islander people, please refer to the following educational materials:
https://tinyurl.com/jwmtxn8y

https://tinyurl.com/hvedv99n

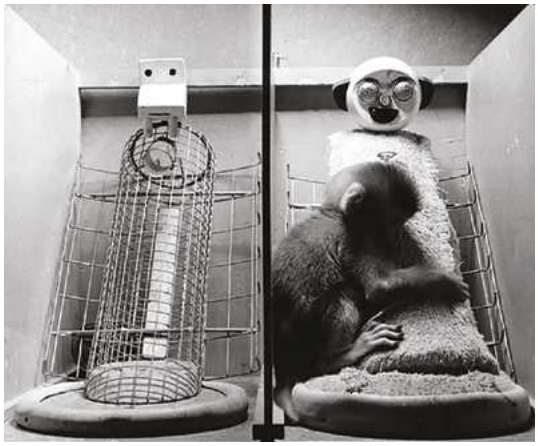
Identify the unethical conduct in each of these infamous Psychology experiments.

Harry Harlow is the comparative psychologist behind "The Pit of Despair," an unethical experiment that used monkeys to learn about clinical depression. Harlow collected a group of monkeys ranging in age from three months to three years old. Knowing full well that juvenile monkeys stay with their mothers for longer than most mammals, Harlow isolated his young test subjects in small, lonely chambers. Every monkey in Harlow's experiment had already bonded with its mother, and therefore the monkeys soon became extremely depressed. After a short amount of time, the monkeys stopped playing and interacting, and two of them even starved themselves to death by refusing to eat. Harlow's experiment was widely condemned as cruel and unnecessary, and most agreed that the results were "common sense."

1.

2.

3.



Answers 1, A and B. 2, A. 3, C. 4, C. 5, D. 6, B. 7, C. 8, A. 9, B 10, D. 11, A. 12, B. 13, B. 14, D. 15, D

In 1965, Martin Seligman conducted an experiment on dogs that was considered unethical. The purpose of the experiment was to investigate whether it was possible to teach helplessness and how control could be perceived. Initially, Seligman placed a dog in a box with a low barrier dividing it down the middle and then subjected the dog to a painful electric shock. The dog quickly learned to jump over the barrier to avoid the shock. Seligman then conducted a more extreme version of the experiment by harnessing a group of dogs together so they couldn't escape the shock. The next day, he put the same dogs back in the box individually, where they could have jumped over the barrier to escape the shock, but none of them did so. This indicated that the dogs had learned to be helpless.

1.

2.

3.

CHECKING FOR UNDERSTANDING

A researcher is interested in gathering information regarding a new treatment which has been used for the last 18 months with a trial group. He asks for volunteers to engage in a focus group to share their personal experiences of the new treatment.

Identify two ethical issues relating to this study.

Issue 1:

Issue 2:

Choose one of the ethical issues identified above and discuss why it is an issue and how the researcher could have dealt with this issue.

SIS 9 ETHICAL PRACTICE

Ethical practice is an integral aspect of psychology.

- Discuss how the following have/have not been demonstrated in research or treatment:
  - respect for the dignity and wellbeing of individuals
  - informing individuals of the nature and purpose of the research/treatment and of any physical or psychological effects that may be expected
  - obtaining voluntary consent from individuals or from their parents or legal guardians
  - protecting any personal information acquired
  - using data only for the purpose for which consent has been obtained
  - respecting the privacy of personal information that is disclosed
  - respecting the right of individuals not to participate in or to withdraw from research/treatment at any time without explanation and without reprisal
  - informing individuals of the results and conclusions of the research.
- Work ethically with others, taking into consideration their physical, cultural and emotional safety.

2022 Subject Outline | Stage 2

Code of Ethics

Most professions have stipulated standards relating to expected conduct and ethical principles which must be followed to ensure the integrity of the services and provisions they provide. The Australian Psychological Society (APS) Code of Ethics, articulates and promotes a set of ethical principles and sets specific standards to guide both psychologists and members of the public to a clear understanding and expectation of what is considered ethical professional conduct by psychologists. This provides an understanding of what is considered minimum expectations regarding psychologists' professional conduct.

The Code is built on three general ethical principles:
A. **Respect** for the rights and dignity of people and peoples (including the right to autonomy and justice).
B. **Propriety** incorporates the principles of beneficence, non-maleficence (including competence) and responsibility to clients, the profession and society.
C. **Integrity** reflects the need for psychologists to have good character and acknowledges the high level of trust intrinsic to their professional relationships, and impact of their conduct on the reputation of the profession (APS Code of Ethics, p7) .

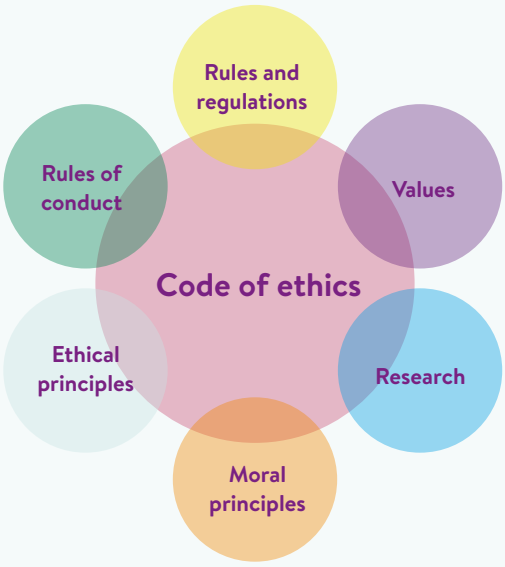


Figure 6.9.1: Australian Psychological Society (APS) Code of Ethics.

The code is accompanied by ethical guidelines for psychological research which cover all aspects of the research, including responsibilities of the researcher, the rights of the research participants, and the use of animals in research. The following ethical guidelines are condensed versions of the conduct outlined in the APS (Australian Psychological Society) booklet.

Freedom from coercion/voluntary participation:
- Participants must have the freedom to say that they don't want to participate in a research project
- They should be advised that they can withdraw from the research at any time without penalty.
- The participants must volunteer to take part in the experiment. They should not be pressured or coerced in any way. Coercion includes large payments of offers of higher grades in their course.

Informed consent:
- The researcher must inform participants about all aspects of the research that are likely to influence their decision to participate in the study, including factors such as risks and discomfort
- Written consent is required
- If the participant is a minor, ie, under 16 years old they cannot give consent without parental consent.
- Psychologists who work with clients whose capacity to give consent is, or may be, impaired or limited (minors under 16 years old), obtain the consent of people with legal authority to act on behalf of the client, and attempt to obtain the client's consent as far as practically possible. Difficulties arise whereby participants have intellectual or mental impairment despite being adults. The researcher must gain consent from legal guardians.
- Parents or legal guardians must be deemed suitable for giving consent, i,e. not under the influence of drugs or alcohol or other mental or intellectual impairment which may impact decision making at the time of consent.

Deception only when necessary:
- Where providing information about the study may influence the participant's behaviour during the research and affect the accuracy of the results deception may be necessary
- Researchers must determine whether the deception is justifiable and ensure that the participant does not suffer distress.
- If deception is used, debriefing is required.

Adequate debriefing:
- The participant must be fully informed of all aspects of the study when it has ended.
- The researcher must correct any mistaken attitudes or beliefs the participant may have about the research.
- The participant should be advised of services available to them should they experience any distress following the research.
- When the study is completed, the participant should be given the opportunity to obtain procedures, results and conclusions.

Confidentiality:
- Information supplied by participants must be kept confidential which involves provisions for storage and disposal of test results and personal data
- Psychologists should only disclose confidential information with permission from the participants or where there is a legal obligation to do so.
- Participants should be informed at the beginning of the research of their confidentiality rights.

No psychological or physical harm:
- The well-being of the participant is paramount therefore participants must not be exposed to situations where Physical or Psychological harm is likely.

Withdrawal Rights:
- Participants must be able to withdraw from the experiment at any time without any negative repercussions. They should not be pressured to stay if they express the desire to withdraw.

Privacy:
- The Psychologist should provide information and explain how data will be collected and recorded
- Provide details of how, where, and for how long, information will be stored, and who will have access to the stored information.
- Psychologists avoid undue invasion of privacy in the collection of information and should be limited to collecting only information relevant to the service being provided.

HELPFUL ONLINE RESOURCES

APS Code of Ethics document:
https://tinyurl.com/22n4w6e3

Work ethically with others, taking into consideration their physical, cultural, and emotional safety

Researchers are required to understand the need to show consideration that some cultural groups may communicate in different ways such as storytelling, art, dance and music. For example, communication through storytelling and/or yarning in the Aboriginal culture is common.

Australia is a land of cultural diversity where research is likely to include participants representing a range of cultural backgrounds. "That is great", you declare as you read this text, after all, we want a representative sample to allow us to generalise the results whilst claiming high external validity and making sound conclusions. However, conducting research in a nation where diversity is rich, requires careful consideration of culturally specific needs to ensure participants emotional and psychological safety are upheld. It is crucial that participants have a sense of safety and inclusion rather than judgement on points of difference.

Cultural relativism is central to psychological research involving diverse cultures and minority groups to avoid ethnocentrism leading to invalid data and subsequent conclusions, particularly where the research design involves **observations** of social interactions and interpretation of behaviours.

Understanding differences in communication will help to ensure cultural safety is maintained, where participant agreement is not confused for consent, for example, both Indian and Aboriginal people often nod in agreement or answer yes to questions they may not understand because they think this is the appropriate response. Others may say yes to a question to end a conversation where they feel uncomfortable in their bid to leave rather than directly agreeing, thus raising further implications regarding consent and wider understanding of their rights when engaged in research.

Knowledge of differences in non-verbal communication such as eye contact, greetings and hand gestures are an important consideration when conducting observational research. For example, Aboriginal and Torres Strait Islander people, avoidance of eye contact is customarily a gesture of respect. In Western society averting gaze can be viewed as being dishonest, rude or showing lack of interest. Likewise, in many Eastern societies, direct eye contact can be perceived as rude or aggressive. Whilst knowledge of what is considered socially acceptable behaviours or taboo topics will be helpful to avoid causing participants emotional, psychological, or physical discomfort during qualitative research designs such as **focus groups**.

Western culture prefers direct questioning compared to Aboriginal and Torres Strait Islander cultures, where indirect questioning is the approach most preferred. Direct questioning may lead to misunderstandings, discourage participation and make it difficult to obtain important information, particularly when a person is communicating in non-Standard English.

Language should be free from colloquialisms based on the researchers' culture to avoid misunderstanding, particularly where there are language barriers within the group or individuals at the centre of the research. Acknowledgement of differences in communication within minority groups will ensure that cultural safety is maintained, e.g., traditions and education within Indigenous groups have been passed on through stories, art and yarning (an important process which helps build relationships and pass on cultural knowledge) rather than written in textbooks.

SCIENCE AS A HUMAN ENDEAVOUR: REAL WORLD APPLLICATION

Cross sectional research conducted into the high prevalence rates of schizophrenia (Sz) within the Black-Afro-Caribbean community found migration or living in their homeland, diagnosis was nine times higher than the white communities. Differences in rates of Sz diagnosis has largely been attributed to Cultural bias, however some researchers have linked this directly to the diagnostic tools developed to enable Psychiatrists to successfully diagnose patients. However, despite a standardised tool, Inter-rater reliability was only reached in 55% of cases where more than one practitioner met directly with patients. Whilst studies indicate a higher genetic predisposition within this community, incidence rates were found to be higher in migrated communities. This brings us back to the concept of cultural bias. The DSM was originally designed based on the observation of psychological disorders within White middle-class communities. Many researchers and practitioners have argued that applying behavioural expectations to ethnic minorities or culture outside of these parameters will cause disadvantaged and ultimately misunderstanding of culturally diverse behaviours. The WHO have since developed the ICD (International classification of Disease) manual from a world-wide perspective meaning Inter-rater reliability should be closer and misdiagnosis based on misinterpretation is reduced.

CHECKING FOR UNDERSTANDING

Discuss one ethical consideration researchers need to be mindful of when conducting research with participants from a different culture?

A child psychologist was interested in differences of infants-parents' interactions, compared to infant-stranger interactions. The researcher conducted an observation and gathered data using behavioural counts. Interactions were monitored for 15 minutes with the parents before they were instructed to leave the room. A stranger then entered the room, where the observation of interactions continued for 15 minutes between the infant and stranger. Infants in the research were all 10 months old.

Discuss one ethical issue relating to this study and **how** it might be addressed.

What is a researcher's responsibility when conducting psychological research with animals?

Outline and **critically analyse** the research conducted by Zimbardo in the Stanford Prison Experiment.

TIPS FOR RESPONDING TO QUESTIONS ABOUT ETHICAL ISSUES

Select ethical issues which are specific to the scenario provided

Scenario: Psychologists asked patients at a local hospital to participate in research regarding new psychological treatments.

Tip 1: If the study does not identify minors, DO NOT identify seeking consent from others as the ethical issue.

Tip 2: Do not identify deception if it is not clear that this has occurred.

Relevant ethical issues:

Participants must be fully informed of the nature of the research and any foreseeable risks or harm due to the possible vulnerability of the participants

or

Privacy should be maintained due to the nature of the information gathered. Participants should also be informed of the collection, storage and sharing of their information.

CHECKING FOR UNDERSTANDING
A REVIEW OF THE SCIENCE INQUIRY SKILLS CONCEPTS

A team of psychologists is investigating the possible emotional impacts of taking a break from using Social Media among a group of year 12 high school students. They hold a meeting to discuss different hypotheses that may be tested in an experiment as well as a consideration of a qualitative investigation they may conduct. They ask you to give your expert opinion on how they should proceed.

Identify the independent variable in this investigation.

..

The dependent variable is emotional impact. Describe one subjective quantitative method of assessing this dependent variable.

..

..

..

..

..

..

Formulate a hypothesis that could be tested in an experimental investigation.

..

..

..

..

..

..

..

Discuss at least two extraneous variables that might arise in this research.

Identify one factor that they should deliberately hold constant throughout the investigation.

Aside from the number and age of participants, suggest one factor they should consider when selecting the sample.

Suggest how the researcher might select an appropriate sample for this research.

Describe one qualitative design they could use.

Describe how content analysis can be used to summarise data from a qualitative design

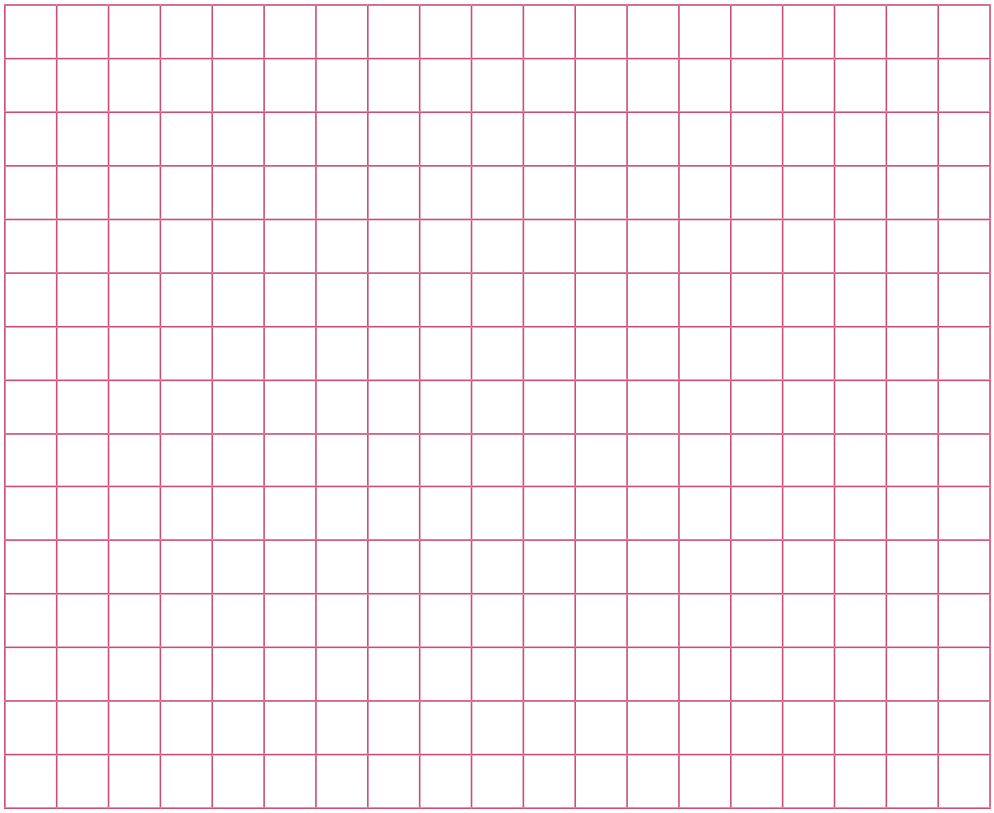
Describe any ethical issues that might be associated with this research and propose how these could be overcome when planning the research.

You advise the researchers to conduct an experiment which collects data from 500 year 12 students from one city private high school, two city government schools, and two smaller country high schools. Students are split into two groups. The students at the private school, and country high schools (Group A) are all required to delete their social media apps from their phone for two weeks. The students at the two city government schools are not required to delete their account but are encouraged to use it less. An "Emotion Scale Test" (EST) is conducted before the research to gather baseline data from all students, and is conducted again after one week, at the end of the research and again one month after the conclusion of the research.
The results showed that students who deleted their social media accounts for two weeks scored significantly higher on the Emotion Scale Test (maximum score 100)

	Emotion Scale Test	Emotion Scale Test
	Group A (No social Media)	**Group B** (Social Media allowed, but discouraged)
Pre-Test	56	58
One Week	51	54
Two Weeks	86	59
One Month Later	76	58
Mean Score		

Calculate the Mean Score for Group A and Group B and enter in the table above. Is this a useful descriptive statistic for this research? Justify your response.

Using the data from the table, plot a graph showing the dependent variable against the independent variable on the grid below. Include a title, labelled axes, and appropriate scales and units.



Provide a possible conclusion for this study.

Critically evaluate the procedures and outline the impact on the data. Explain any limitations in your conclusion and determine whether these results can be generalised to the research population.

Writing an Investigation Report

This information should be used in conjunction with the SACE Subject Outline practical requirements to help develop student skills in Deconstructing, Designing, Conducting and Writing a formal investigation report.

Introduction

A research investigation is a question that is asked for consideration or inquiry. Problems may be raised because of direct observation or may be prompted by discussion or research.

The investigation of a problem can take various forms. One is to employ scientific methods to collect data to formulate and justify a conclusion. This involves developing a valid procedure that uses scientific measures interpreting and analysing the results, and critically evaluating the evidence obtained in order to justify a conclusion.

The process used to determine the best way to investigate a research investigation is called Deconstruction. This involves breaking the research investigation down so that a range of aspects that could possibly affect the outcome of the Investigation can be explored, taken into account, and properly discussed. By deconstructing a topic, the most appropriate procedure to use to investigate it can then be designed, and conducted.

STEP ONE: DECONSTRUCTING THE TOPIC

There are three aspects of looking at and investigating a research investigation as follows:

- **Deconstructing** the problem
- **Designing** an investigation based on your findings
- **Conducting** the investigation and preparing a report of it.

It is usual to start with a particular 'Problem', or 'Question'.

The activity presented here only involves the theoretical exercise of Deconstructing the problem to develop your knowledge and skills of the deconstruction process. It is important however that this should be able to lead on to the Design and implementation of a Scientific Investigation.

With direction from your teacher, present a one-page Deconstruction of one of the following Problems:

- Does the size of a team affect the productivity of the team?
- Does explicitly teaching teamwork skills, enhance the completion of tasks within a team?
- Does bullying within a team impact the productivity within the team?
- Does groupthink occur within teams when there is a limited amount of time to complete a task?
- Does communicating face to face versus via digital communication enhance team wellbeing?

1. Research your chosen topic focusing particularly on the factor you are interested in investigating.
2. Explore factors that impact your chosen topic.
3. Consider the most appropriate research design (experimental, observational or qualitative) for investigating your topic.
4. Consider the most appropriate research methods that would be best suited for collecting data for your topic.
5. Explore factors such as population, sample, sampling techniques that might suit your investigation
6. Consider potential constant or confounding variables that need to be planned for.
7. Explore and address the ethical, cultural and safety risk factors involved in conducting your research
8. Select the features that will realistically be able to be achieved for your research

Brainstorm with others, to record questions and points whilst you consider options about formulating your ideas and what you might be able to test.

Evidence of Deconstruction may be presented in a number of ways, for example: Notes, a Concept map, a Table, Lotus diagram, Answers to directed questions or aspects or some other way.

Once you have completed your Deconstruction you may proceed to the next phase which is 'Designing your own Investigation'. A proposed outline of one way of proceeding is included on the following pages.

STEP TWO: DESIGNING YOUR OWN INVESTIGATION

An Investigation is a process that involves inquiry and exploration. Scientific investigation is the way scientists obtain evidence-based solutions to problems, or answers to questions about the world around us.

A scientific Investigation can be undertaken following an existing set of instructions, or one can be planned from the beginning and then carried out. The process used to put together and document an investigation of a problem is called Design. The Design of an investigation is best done following a process of Deconstruction.

To Design an Investigation of a research question for which the outcome is uncertain, use the following headings and dot-points as a guide:

JUSTIFICATION

It is important to include a rationale or justification of the procedure based on theoretical and safety considerations, pre-trials and other factors that should be included. In other words, students must justify their plan of action. It is recommended that this can be done for each section using, for example, text boxes or a different colour font.

- Deconstruct the problem
- Provide justification of choices made in the Design using annotations or another method.

VARIABLES

- Identify the independent variable (IV) to be explored and the dependent variable (DV).
- Make clear how the IV will be changed, and how many times.
- Include how the IV and DV will measured, and the units of measurement.
- List factors to be held constant and describe how and why they need to be held constant.
- List factors that may not be able to be held constant or controlled, state why not, and consider the potential impact of this on the data/investigation.

HYPOTHESIS OR RESEARCH QUESTION

- Provide a hypothesis expressed with a single IV and DV as a … If … then … statement. This needs to relate to the purpose of the Investigation. If using a qualitative research design, clearly state the research question, and justify why this hypothesis or question was chosen.

RESEARCH DESIGN AND METHOD

- Describe and justify the research design selected for the investigation (experimental, observational, or qualitative)
- Make clear the type and amount of data to be collected e.g., qualitative data (descriptive), quantitative data (numerical), objective or subjective, sample sizes, and averages.
- Detail how data will be collected that is reliable, and accurate.

OTHER CONSIDERATIONS

- Include a blank table to show the data to be collected and recorded.
- Provide a description of the expected results.
- Identify safety and/or ethical risks and describe how they will be managed.

Evidence of Design *may be presented in a number of ways. One example of a suggested layout that uses a combination of sub-headings and tables for different parts of the Design is shown below. Your teacher will provide further direction about what is required.*

Research Investigation topic:

Variables

Independent variable ..

Dependent variable ..

Factors to be held constant

5 factors to be held constant	How the factors will be held constant	Why the factors need to be held constant

Factors that may not be able to be controlled

2 factors that cannot be controlled	Why the factors cannot be controlled	Potential effect on the data/ investigation

Hypothesis or Research Question

..

..

Research design

..

..

Research method

..

..

Ethical considerations / risks

Ethical considerations	Management

STEP THREE: CONDUCTING THE INVESTIGATION

Your teacher will set out guidelines, including ethical and safety considerations, about how this is to be achieved.

STEP FOUR: WRITING A RESEARCH INVESTIGATION REPORT

The requirements of the practical report are to be found in the SACE Subject Outline. In particular, the word count for the Introduction, Analysis of results, Evaluation of method/procedure and Conclusion should not exceed 1500 words. The Deconstruction and Design, including the method chosen and the justification of the plan of action must be a maximum of four sides of an A4 page and needs to be attached to the practical report.

For each investigation, students present an individual report.
The report may include:

Introduction
- introduction with relevant psychological concepts, and either a hypothesis and variables, or an investigable question

Method
- the method or process that was implemented
- identification and management of safety and/or ethical risks

Results
- Display the results using tables and graphs.
- Support data using sample calculations.
- Ensure the format of the tables and graph is consistent with conventions regarding titles, headings, and presenting data to two significant figures

Analysis
- Analyse the data to identify a trend or pattern (if any) and
- discuss the relationship between the independent and dependent variable using psychological information/theory.
- Linking results to concepts

Evaluation
- Evaluate the procedure and data to identify sources of uncertainty
- Assess the reliability, accuracy and validity of the results, by discussing sample size, sample representativeness, factors that cannot be controlled.

Conclusion
- Form and justify a conclusion that relates to the hypothesis or research question.
- Discuss any limitations of the conclusion based on the procedure and the results.

The report should be a maximum of 1500 words if written, or a maximum of 9 minutes for an oral presentation, or the equivalent in multimodal form.

Suggested formats for presentation of a practical investigation report include:
- a written report
- an oral presentation
- a multimodal product.

Only the following sections of the report are included in the word count:
- introduction
- analysis of results
- evaluation of procedures used in collection of the data in selected study
- conclusion and justification.

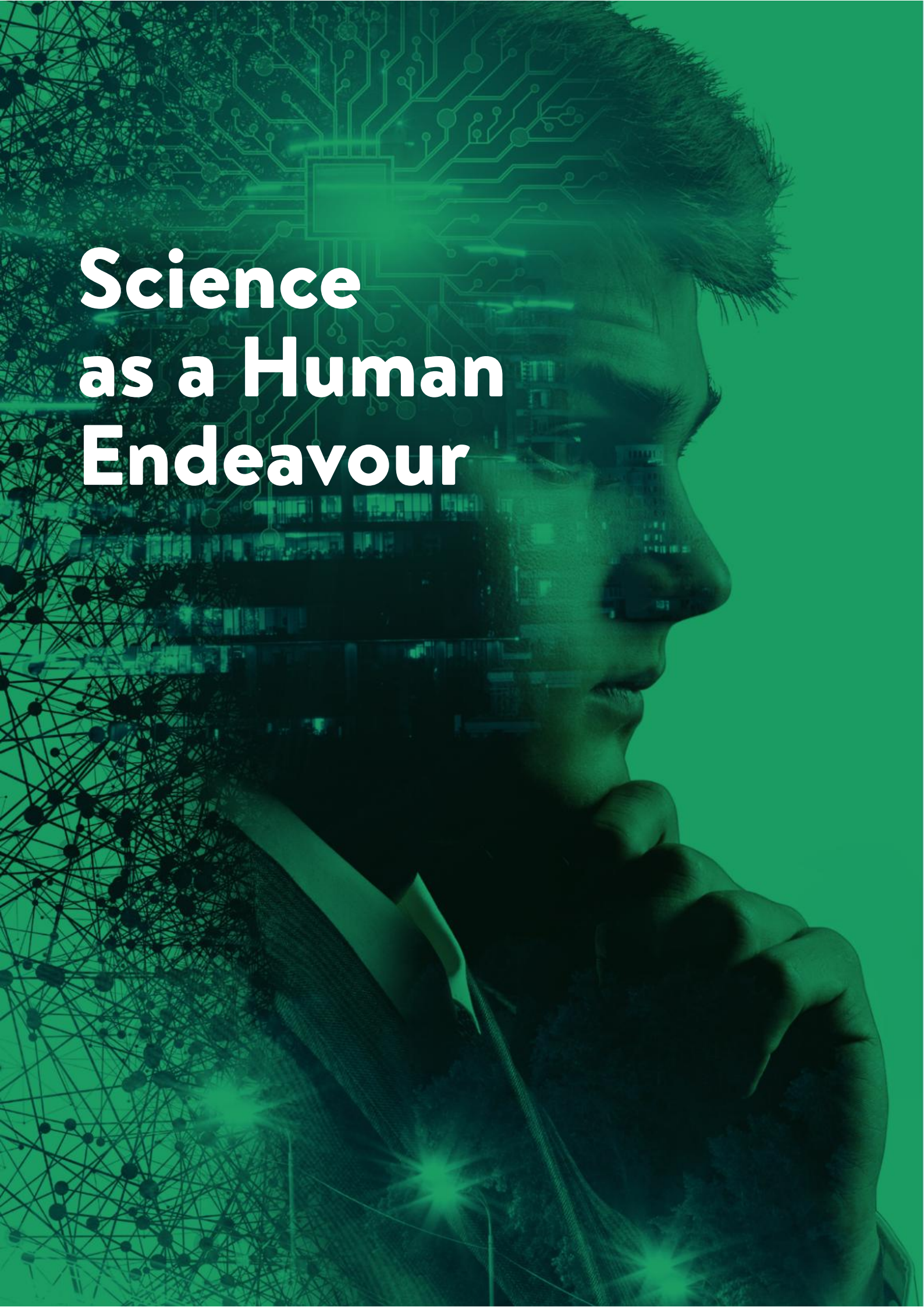
Writing up a Psychology Investigation report

A guide to approximately how many words for each section is given in brackets. The Purpose, Hypothesis, Results, Deconstruction, Design, and References sections are not in the word count. For the relevant Assessment Design Criteria see the ADC column.

Note: the word count for Introduction, Analysis, Discussion and Conclusion in Stage 2 is a maximum 1500 words.

Section	Evidence	ADC
Introduction (~300 words)	• Introduce your topic, by explaining what it is and giving an example. Briefly discuss how it can influence people and why it is important that we study it. (It may be helpful to add a few sentences here to indicate what other research in this area has found). • Clearly state your research question (Qualitative methods), or hypothesis (experimental or observational) and weave it into the prose. • Clearly identify the independent and dependent variables and state whether each is subjective quantitative data or objective quantitative data. • Clearly outline (1) which data you will use to address the research question/hypothesis, (2) how you will sort the data you need from the original data, (mean scored calculated and plotted to presented in graphs and (3) Which calculations you will carry out, e.g., mean, mode, median, SD. • State which tables and/or graphs you will use to answer your research question (or test your research hypothesis) e.g., a scatterplot will be used to present the mean	KA1
Results *Do not include raw data*	Tables • Any table(s) you use must have a title that clearly describes its purpose. • All rows and columns must be clearly labelled with appropriate units in brackets. • Numbers in the table should be presented to the appropriate number of decimal places, generally two. Graphs • The graph must have a title that clearly describes its purpose. • Large enough to be clear (about one third of page) • Graphs with labelled axes (with units), appropriate scales, an appropriate size, and in a format to suit the type of data.	IAE2
Analysis (~200 words)	The purpose of this section is to interpret the data and make conclusions about whether it answers the research question or support the hypothesis. • Be specific in identifying if the shows an in/decrease between the IV and DV • Trends in the data are identified and an explanation of these trends in terms of relevant concepts is provided.	IAE3

Evaluation (~700 words)	Strengths and Weaknesses in the Investigation. Headings for each sub section is not required, eg, reliability etc. Only the headings identified in each section of this guide should be used to reflect the reporting in a real-world Psychological investigation and Tertiary reports. • **Reliability** - does the test measures what it is supposed to each time it is used and in all circumstances? If standardised tests are used it is more likely to be highly reliable unless subject to random errors, eg poor measuring tools or social desirability factors. • **Random errors** - Could errors have been made in the recording of the data by participants themselves or in the collation of class data? • **Strengths and limitations** of the type of data collected. • **Validity (internal)** - does the measure used for the dependent variable measure what it is supposed to measure? **Remember that a measure can be reliable even though it is not valid, but a measure cannot be valid unless it is reliable** • Can the results be applied beyond the setting thus gathering the same results in a natural setting/situation (real life), thus questioning **Ecological validity**. E.g., measuring physiological responses to arousal in a lab vs participants wearing smart devices and noting when they are listening to music allowing the researcher to look back at the data collated from everyday life. • Sampling methods and limitations, eg, bias and representativeness thus ability to make generalisations – **External validity** • Discuss how effectively the research method was able to minimise extraneous variables (such as experimenter effects, participant variables, and situational variables).	IAE4
Evaluation (~700 words)	**Ethical Considerations** • Identify ethical guidelines that were adhered to. • Identify ethical guidelines that were not adhered to. - Confidentiality /Anonymity - Voluntary participation - Right to withdraw - Informed consent (role of any deception?) - Debriefing - Possible harm (Physical & Psychological) - Accurate reporting - Professional conduct *Important to note. For each weakness you identify, you will be required to make a recommendation to address this. If you only identify the weakness without making recommendations, you will limit your ability to meet some of the performance standards required in the Investigation.*	IAE4
Conclusion (~300 words)	• Has the investigation allowed you to answer the research question (state it) • Was the hypothesis (state it) accepted, partially accepted or the null hypothesis accepted (hypothesis rejected as no relationship can be established) • Summarise significant findings and or flaws if there are any • What is the usefulness of this research, eg, can it be used in the real world, if so, how? (Eg) Research can be used to educate people around reducing or increasing arousal levels such as students before a test or an athlete before a big game.	IAE3
Communication	• The correct format for the structure of a report is used. • Information is communicated clearly. • Write clearly so that the points that you make can be easily understood by the reader. • Avoid using the first person (e.g., I, we, us) or second person (e.g. you, yours). Preferably write in the third person (e.g., he, she, it, they). • Total word count should be 1500 words • Appropriate psychological terms and conventions are used. • External references (if used) are acknowledged appropriately.	KA4



Science as a Human Endeavour

SHE 1 SCIENCE AS A HUMAN ENDEAVOUR

Communication and Collaboration

- Science is a global enterprise that relies on clear communication, international conventions, and review and verification of results.
- Collaboration between psychologists and stakeholders advances research and understanding. It requires shared evidence from many sources in a multidisciplinary approach.

Development and Application

- Developments in research and technology lead to advances in psychological understanding.
- The application of psychological understanding can enable scientists to develop solutions, design actions, and evaluate and respond to economic, sociocultural, and environmental factors.

Influence

- Psychological knowledge and its application are both influenced by, and influence economic, sociocultural, religious, ideological, political, and environmental perspectives in a local, national, and global context.
- The use of psychological knowledge may have positive, negative, or unexpected consequences that require monitoring, assessment, and evaluation. The use of psychological knowledge must take into account risks and ethical considerations.

2023 Subject Outline | Stage 1

The science as a human endeavour strand highlights science as a way of knowing and doing, and explores the purpose, use, and influence of science in society.

Society can influence Science, and Science can influence Society

SHE tasks are designed to be based on contemporary examples of psychology and reflect the interaction between science and society.

HOW SOCIETY IMPACTS SCIENTIFIC RESEARCH

For example, you might like to explore how changes in society are impacting what psychologists are currently researching. Consider changes to mental health research in the last 15 years around the change from researching depression to understanding the positive psychology elements of wellness. Consider how technological advancements in social media, working online, the impacts of Covid 19 are impacting what scientists are now researching to better understand how these societal changes are impacting mental health.

HOW SCIENTIFIC RESEARCH IMPACTS SOCIETY

You might like to seek out examples of contemporary research into new therapies, interventions, research topics impact on society. Teachers and students can look at psychology in practice and investigate examples of how research has led to unintended consequences, or new breakthroughs that influence society.

Science as a Human Endeavour encompasses the dynamic relationship between science and society, influencing our daily lives. It goes beyond simply changing our teaching methods; it compels us to re-evaluate how we teach and learn science and the purpose behind it. This shift involves perceiving science education from a different perspective and ensuring that educators incorporate diverse viewpoints in their teaching and learning approaches. Embracing this transformation entails recognizing the deep connection between science, people, and culture. It means acknowledging that teaching science requires reflection and even critique of the scientific discipline itself. It involves situating science within socio-cultural contexts, allowing students to explore the current and historical aspects of science. In essence, effective science education aimed at promoting scientific literacy necessitates the integration of three interconnected agendas: enabling students to develop a conceptually accurate understanding of the scientific concepts through constructivist methods, fostering their ability to reflect on the nature of science itself (Nature of Science: encompassing its philosophies, agendas, history,

and practices), and encouraging students to place this knowledge within a broader socio-cultural framework (Science as a Human Endeavour).

Writing an effective SHE response requires a solid comprehension of the essential concepts such as communication and collaboration, development and application, and influence. It requires the ability to apply these concepts to real-world scenarios and challenges, as well as to recognize how scientific research can be utilized to inform and solve societal issues. Additionally, strong research skills are crucial for crafting a good SHE response, which includes the ability to locate and assess pertinent scientific literature and use it to bolster one's arguments and ideas.

SHE Activity: The following information has been provided as a prompt which is followed by an exemplar answer using the SHE concepts.

The contribution of digital technology to the global dissemination of psychological treatments

The Mental Health Care Innovation Network (**www.mhinnovation.net**), the largest repository of innovations in global mental health, has identified 38 innovations that are using digital technology to disseminate empirically supported interventions (24th April 2016). These include a wide range of approaches with distinct goals including the direct delivery of treatments such as cognitive behaviour therapy; social networking for mental health care provider supervision; digital platforms for service users to share experiences and support one another; case management systems for monitoring the delivery of care; telemedicine systems to provide mental health care to remote populations or supervision to front-line workers; screening and decision-support tools for front-line workers; video game interfaces to address psychopathology targets; and text messaging to motivate patients.

A systematic review of the evidence based on interventions to disseminate psychological treatments (Naslund et al.,) identified 44 studies that used digital technology for the treatment, diagnosis, or management of mental disorders, or for providing mental health training and education to health workers. The review found that these methods were well accepted and while it was concluded "that mobile and online technologies may hold significant potential to extend workforce capacity, reach forcibly displaced persons and refugees, support young people with mental disorders who are high users of mobile devices, and empower patients and families to take charge of their own care and to support each other through online communities" it was also noted that there has been little formal evaluation of their effectiveness. This is possibly the most important immediate priority for the field of global mental health, i.e., to identify best practices in each of the domains of technology-assisted delivery of psychological treatments.

EXEMPLAR SHORT ANSWER RESPONSE

The key concepts of development and application underpin the study of psychology and are critical to understanding how advances in research and technology can lead to a better understanding of human behaviour and mental processes. This is particularly relevant in the current era of rapid technological change, where new technologies are transforming the way that psychologists conduct research and develop solutions to complex problems.

In the article "Technology Integration in Psychology: Opportunities, Challenges, and Future Directions," the authors explore the ways in which technology is being integrated into the field of psychology. They argue that technology has the potential to revolutionize psychology research and practice by providing new tools for data collection and analysis, as well as for the delivery of psychological interventions.

One example of how technology is being used in psychology is in the area of virtual reality (VR). VR allows researchers to create realistic simulations of real-world situations, which can be used to study how individuals respond to different stimuli in a controlled environment. This has the potential to revolutionize the field of psychology by providing new opportunities for studying complex human behaviour in a safe and controlled environment.

Another area where technology is being used in psychology is in the development of mobile applications (apps) for mental health. These apps provide individuals with access to psychological interventions and support in a convenient and accessible way. This has the potential to improve mental health outcomes by increasing the availability of psychological interventions to those who may not have access to traditional forms of treatment.

However, the authors also note that the integration of technology into psychology is not without its challenges. One of the main challenges is ensuring that technology is used in an ethical and responsible way. This requires careful consideration of issues such as data privacy,

informed consent, and the potential for unintended consequences.

Another challenge is ensuring that technology is used in a way that is effective and evidence-based. This requires careful evaluation of the effectiveness of new technologies and interventions, ensuring that they are grounded in sound psychological theory and principles.

Despite these challenges, the authors argue that the integration of technology into psychology has the potential to revolutionize the field and provide new opportunities for research and practice. They call for a collaborative approach to the integration of technology, with psychologists working together with technologists and other stakeholders to ensure that technology is used in an ethical and responsible way.

In conclusion, the key concepts of development and application are critical to understanding how technology is being integrated into the field of psychology. While technology has the potential to revolutionize psychology research and practice, it is important that it is used in an ethical and responsible way, and that new technologies and interventions are grounded in sound psychological theory and principles. By working together in a collaborative way, psychologists, technologists, and other stakeholders can ensure that technology is used in a way that maximizes its potential benefits and minimizes its potential risks.

Use the Performance standards provided below to peer grade this exemplar student response.

SHE PERFORMANCE STANDARDS

	A	B	C	D	E
KA1	Demonstrates deep and broad knowledge and understanding of a range of psychological concepts.	Demonstrates some depth and breadth of knowledge and understanding of a range of psychological concepts.	Demonstrates knowledge and understanding of a general range of pyschological concepts.	Demonstrates some basic knowledge and partial understanding of psychological concepts.	Demonstrates limited recognition and awareness of psychological concepts.
KA3	Critically explores and understands in depth the interaction between science and society.	Logically explores and understands in some depth the interaction between science and society.	Explores and undestands aspects of the interaction between science and society.	Partially explores and recognises aspects of the interaction between science and society.	Attemps to explore and indentify an aspect of the interaction between science and society.
KA4	Communicates knowledge of psychology coherently, with highly effective use of the appropiate terms, conventions, and representations.	Communicates knowledge and understanding of psychology mostly coherenlty, with effective use of appropiate terms, conventions and representations.	Communicates knowledge and understanding of psychology generally effective, using some appropiate terms, conventions, and representations.	Communicates basic psychology information, using some appropiate trms, conventions, and/or representations.	Attempts to communicate information about psychology.

(SACE 2022)

Grade: _____

Justification

HELPFUL ONLINE RESOURCES

Watch the following video clip to enhance your understanding of how to successfully write a SHE response in Psychology.
https://tinyurl.com/yf5vpsxs

The interaction between psychologists and stakeholders

There are a number of different stakeholders in society all of who benefit from the research that scientists undertake in the field of psychology, and all of whom influence and contribute to the research that scientists undertake.

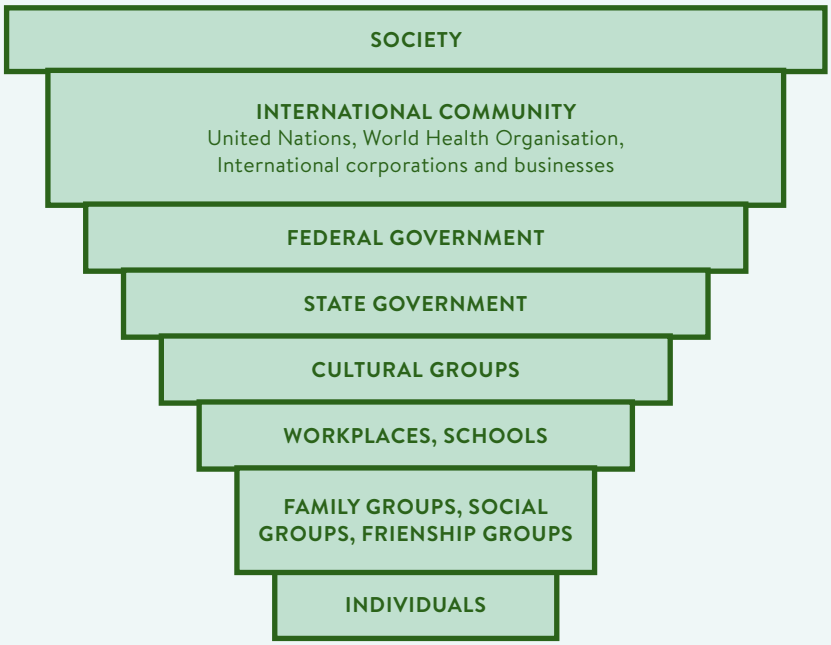


Figure 7.1.1: Stakeholder groups to consider when exploring SHE investigations.

CHECKING FOR UNDERSTANDING

Consider the topic of social media addiction. This is a current topic in the field of psychological research, and is particularly an issue for certain groups within society. **Use the table below to identify how some of the key stakeholders may influence scientific research in this field.** Write a brief paragraph to explain your thinking, whilst referring to SHE concepts in your response.

*For example. If teenagers are showing higher levels of mental health disorders as a result of social media addictions, this may have a social impact, as this will interfere with friendships, relationships. It may also have an economic impact if teenagers do not finish school as a result of their mental health, and therefore struggle to become employed. This is a topic that scientists would be interested in researching, to try and **develop a solution** to this problem. Conducting research and influencing government, may see legislation in this area aimed at protecting young people when they are unable to protect themselves.*

STAKEHOLDERS		INFLUENCE
Society	Social media addiction	Social perspective
International Community		Economic perspective
Federal Government		Cultural perspective
State Governments		Ethical perspective
Cultural Groups		Political perspective
Workplaces		Environmental perspective
Schools		
Family, Social Groups, Friendships / relationships		
Individuals		

COMMUNICATION AND COLLABORATION	DEVELOPMENT AND APPLICATION	INFLUENCE
Acknowledgement that this psychology topic is of interest on a global scale and relies on clear communication regarding reviewing and verifying results. A discussion of the contribution of any individuals, teams or organisations that were involved in the development of the topic being discussed.	A discussion about how new research and / or technologies improved data collection and analysis, revealing new evidence that helped develop solutions and/or recommendations A discussion about how the research progressed a discovery in response to an economic, social, cultural, environmental or sustainable factor.	A discussion of how advances in psychological understanding are **influenced by** economic, sociocultural, religious, ecological, environmental, sustainable, ideological and political perspectives in a local, national and global context.
	A discussion of how the research informs public debate, or the psychology is linked to public debate. Where new factors or limited data exist, limitations result. *Describe what the debate is and any limitations.*	A discussion of how advances in psychological understanding **influence other perspectives** such as economic, sociocultural, religious, ecological, environmental, sustainable, ideological and political perspectives in a local, national and global context.
Science requires communication, which uses international conventions, and the review and verification of results. Describe who is communicating and collaborating. Think of all the organisations, from school groups to the United Nations, universities, action groups, professional organisations, local organisations, community groups, etc who are involved with the issue. Think of individual scientists and teams of scientists. *Describe how they are communicating results and working together to add to knowledge.*	Application of our knowledge may also have consequences – beneficial or unexpected. All applications require monitoring and evaluation of risk and can provide further opportunities. Multiple lines of evidence come from a range of needs and values. *Describe these.*	A discussion of how psychological knowledge may impact people in a beneficial way, or create unexpected consequences requiring monitoring, assessment and evaluation of risk, through ethical considerations.
	Application: Our scientific knowledge, understanding and inquiry can and has led to the development of solutions and discoveries. From this, actions can occur. These actions have social, economic, cultural, ethical, political and environmental impacts. Describe the impacts and the risk.	**Social:** Dealing with human beings in their relations with each other. Think of friends, partners, children, people at work, medical staff.
	The development of scientific theories and models requires a wide range of evidence from many sources and disciplines (e.g. psychology, sociology, philosophy, biology, statistics, etc.) *Describe the development of any new theories and techniques looking at all the evidence from as many sources as possible over time. You could use a timeline to show events and setbacks. Include evidence of progress, ambiguities, disagreements and uncertainties.*	**Economic:** Having to do with the production, distribution and consumption pf goods and services. Think of research companies, production and use of biological materials and processes.
		Cultural: Having to do with the customs, arts and conveniences of a nation or people at a time. Think about what attitudes are communally held about things and the ways in which people perceive and go about things.
International collaboration is often required. Think of all the international organisations involved, any conventions, rules, conferences, etc. The publication of science journals which are all online, international conferences and agreements involving governments and the United Nations are all part of this. *Describe who and what organisations are collaborating, and what benefits or issues arise from international collaboration.*	New technologies improve the way scientists perform procedures and collect data for analysis. This new evidence can therefore replace old theories, models and processes or modify them. *Describe the new technologies and the impact they are having on old ways of seeing or doing. Who or what is resisting change?*	**Ethical:** Having to do with standards of right and wrong: of ethics and morals. Moral conduct, duty and judgement. Think about forcing people to do things or looking at what harm might be caused by an action. Is harm to some better for all of us?
	Advances in one field can influence and be influenced by other areas. Science impacts on the development of technologies and engineering of products and is in turn influenced by the need for technological advance. *Describe the influences of the fields involved*	**Political:** Having to do with citizens or government. The management of political business, policies, laws or methods. This is about who makes decisions and follows them up in society, and any legal applications involved.
	Our knowledge can be used to offer explanations and make reliable predictions. *Describe any predictions. Results of the research may result in ambiguity or uncertainty. How do psychologists develop new understanding and insights and produce innovative solutions. What recommendations do students come up with to explore their own solutions to current and future problems and challenges.*	**Environmental:** All of the surrounding things, conditions and influences affecting the growth of living things. Think of all abiotic and biotic factors and how they interact.

CHECKING FOR UNDERSTANDING

Use the following articles to complete a SHE response.
Title: **Mental Health Apps: Innovations, Ethical Considerations, and Public Health Implications**:
https://tinyurl.com/55wm8hdz

CHECKING FOR UNDERSTANDING

Title: **Advances in Digital Mental Health: Clinical Interventions in the Digital Age:**
https://tinyurl.com/2syra3wz

Below is a range of contemporary issues in psychological research that could provide opportunities to practice SHE responses, conduct further research in these areas and find short articles that align to the area of interest. Once you have selected your issue and found scientific articles, attempt writing a SHE response. Don't forget to explicitly identify the SHE concepts that you are going to address.

Mental health: The COVID-19 pandemic has brought renewed attention to the issue of mental health, with increased rates of depression, anxiety, and other mental health conditions. Researchers are exploring new ways to improve mental health care and reduce stigma around mental illness.

Social media and mental health: The role of social media in mental health is a growing area of research, with studies exploring the impact of social media on mood, self-esteem, and other psychological processes, as well as the development of new interventions to address issues related to social media use.

Climate change: Climate change is having a growing impact on mental health, with increased rates of anxiety, depression, and other mental health conditions related to climate-related stressors such as natural disasters and environmental degradation. Researchers are exploring the psychological impacts of climate change and developing new interventions to address them.

Diversity, equity, and inclusion: The field of psychology is grappling with issues related to diversity, equity, and inclusion. This includes issues related to bias in research, cultural competence in clinical practice, and social justice.

Long-term outcomes of ADHD interventions: At home, relationship difficulties and break-ups are more common. The risk of drug and substance abuse is significantly increased in adults with persisting ADHD symptoms who have not been receiving medication. The genetic aspects of ADHD mean that adults with ADHD are more likely to have children with ADHD.

Neurobiological markers of ADHD: Investigate the neurobiological markers associated with ADHD using neuroimaging techniques such as functional magnetic resonance imaging (fMRI) or electroencephalography (EEG). Currently, the diagnosis of attention deficit hyperactivity disorder (ADHD) is solely based on behavioral tests prescribed by the Diagnostic and Statistical Manual of Mental Disorders, 5th Edition (DSM-5). However, biomarkers can be more objective and accurate for diagnosis and evaluating treatment efficacy.

Cyberbullying and mental health outcomes: Investigate the impact of cyberbullying on mental health outcomes, such as depression, anxiety, and suicidal ideation, among adolescents. Explore the specific characteristics of cyberbullying incidents, such as the frequency, duration, or type of cyberbullying behaviors, and their association with different mental health outcomes.

Long-term consequences of bullying: Conduct a longitudinal study to examine the long-term consequences of bullying victimization or perpetration on various aspects of individuals' lives, including mental health, social relationships, academic achievement, and occupational outcomes. Explore potential protective factors or interventions that can mitigate the negative effects of bullying over time.

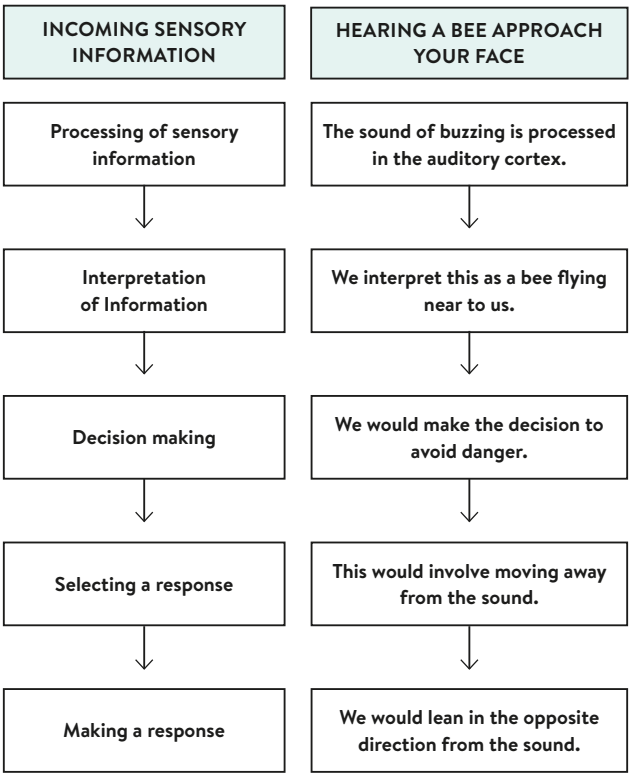
Bullying prevention and intervention strategies: Evaluate the effectiveness of different bullying prevention and intervention programs implemented in schools or community settings. Assess the impact of specific components, such as empathy training, bystander intervention, or restorative justice approaches, on reducing bullying incidents and improving the well-being of those involved.

Answers to student activities

Please note: Answers provided for Short Answer and Extended Response questions are to be used as a guide only, as more than one answer may be possible.

Topic 1.1

Checking for Understanding (Page 10)



Topic 1.2

Checking for Understanding (page 15)

The modal model of ***memory*** theorises three different memory stores. The first is the sensory ***register*** which filters for ***incoming*** information that is important. Less important information may be lost, however, if attention is paid it is first stored in the ***short-term*** memory. If this information is given enough ***maintenance*** rehearsal and is properly ***encoded*** it will be passed on to the ***long-term*** memory store. If not, the information will only last a short time before it is lost. Once in the long-term memory it may be ***retrieved*** later or be lost over time.

Checking for Understanding (page 16)

Episodic Memory	Example: You remember where you were when you heard a famous person had died.
Semantic Memory	Example: The floral emblem of South Australia is Sturt's desert pea.
Procedural Memory	Example: You put on your seat belt, check all mirrors and put on the indicator before moving off from the curb when driving.

Science Inquiry Skills (page 18)

Evaluate the modal model of memory for its strengths and weaknesses. How strong is the evidence, given that it used simple recall experiments only? Are there other processes/factors that were not considered?

The modal model of memory is a simplistic model as it does not account for the vast amounts of incoming sensory information that we are receiving at any one time. The experiments used as evidence for the model focused on simple activities such as recalling a list of words or nonsense syllables. This was done to control for other variables such as prior knowledge but may not be able to be applied to more complex situations such as learning abstract ideas or links between concepts. Other factors such as motivation, competing sensory information and intelligence levels have not been considered in these experiments. There may also be other processes that we are not yet aware of at play in the area of memory.

Discuss the strengths and weaknesses in using experimental designs in investigating memory.

Experimental designs allow the researcher to control other variables so that the relationship between the independent variable and dependent variable can be analysed. This means that causal relationships can be found more easily, giving them internal validity. However, it is very difficult to control all variables when people are used in research as we all have differences in how we process and interpret information. The experiments also use overly simplistic situations that cannot be easily likened to real world situations, giving them low ecological validity.

Discuss the strengths and weaknesses of using objective quantitative data when investigating memory.

Data that is objective (cannot be subject to bias) and quantitative (in numerical form) is useful as it can easily be analysed with statistics and graphs to show a relationship between the variables being considered. It is also more reliable as there has been no interpretation by people which could be biased and impact the results. However, it can only measure one aspect of a phenomenon and cannot give detailed information about the inner processes underlying the data. More understanding can only be gained by collecting qualitative self-reported data about people's experiences, thoughts and feelings.

Topic 1.3

Checking for Understanding (page 19)

Activity	Structural Processing	Phonetic Processing	Semantic Processing
Writing down words from the board	✔		
Watching a video about a topic	✔	✔	
Writing a paragraph using key words provided			✔
Listening to a list of words being read out		✔	
Hearing words broken into syllables		✔	
Comparing the meaning of words to each other			✔
Putting information into your own summary			✔
Breaking down words into syllables on your page	✔		
Creating a mind map linking similar ideas	✔		✔
Taking your own notes from a video	✔	✔	✔

Topic 1.5

Science Inquiry Skills (page 22)

Explain why research into state-dependent memory cues on humans and animals may be unethical.

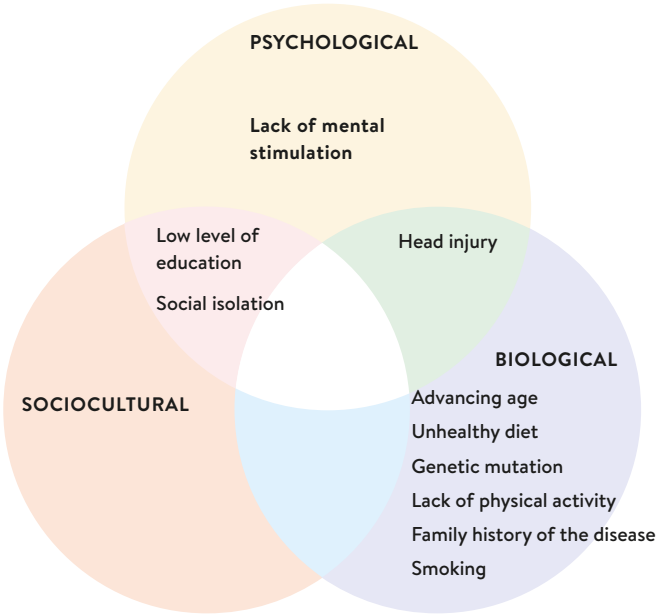
Research into state-dependent cues would probably involve the use of drugs. This would induce a certain state that could be used to learn information and then be induced again to measure participants' ability to recall the information at a later time. This is unethical because it could cause harm to the participants as some drugs can have harmful effects and may be illegal for this reason. It may also lead to cravings or an addiction to the drug which can have further harmful psychological and physical impacts.

Checking for understanding (page 23)

Term	Definition	Example
Proactive Interference	Previous information interferes with the learning of new information.	The character in my book reminds me of a friend called Sarah so I keep forgetting her actual name.
Retroactive Interference	Recently learned information interferes with older memories.	Visiting Auckland has made me forget that the capital of New Zealand is actually Wellington.
Retrieval Cues	Environmental cues that bring a memory back into consciousness.	The smell of my mother's perfume takes my mind back to a family holiday.
Context-dependent Cues	Cues that come from our surroundings that prompt recall.	When I am in my yoga class I can remember my classmates' names better.
State-dependent Cues	Internal cues that make it easier to recall information when in the same state as it was learned.	When I feel sad, I remember to watch my favourite movie to make me feel better like the last time I felt this way.
Memory Consolidation	New memories need to have time to be incorporated into the long-term memory.	I walked out of the classroom too quickly after finishing my work and didn't remember the last thing I learned.

Topic 1.6

Checking for understanding (page 26)



Topic 1.8

Checking for Understanding (page 30)

Compare two mnemonic devices. Which is more likely to produce more long-lasting memories and why?

Clustering involves using a single retrieval cue to help remember a chunk of information. This is relatively deep learning as it requires you to semantically encode the chunks by grouping similar objects or ideas. However, it doesn't require much thinking beyond this point so the items or ideas may be forgotten once the retrieval

cue has been used. In contrast to this, reworking uses semantic processing to make meaningful connections within the information. Because it is processed more deeply the information is then likely to be remembered for a longer time, especially if it is related to something personally relevant to you.

Checking for Understanding (page 31)
If you were to design an experiment to compare the effectiveness of both strategies, which would you keep the same: the participants in the groups or the information being learned? Justify your choice.
I would keep the people in the groups the same as this would control for participant variables as the same people would experience both conditions. The information learned would then need to be different or they may still be able to recall it from the previous memorisation method.

Alternatively
I would keep the learned information the same but change the participants. This would mean that the information is more controlled and should not contain bias if one set of information is more likely to be recalled than the other. The participants would also not get tired or already remember the information from the previous memorisation method.

Topic 2.1

Checking for Understanding (Page 49)
1. Changes caused by the Autonomic Nervous System:

Body Part / Function	Sympathetic	Parasympathetic
Heart Rate	Increases	Decreases
Blood Pressure	Increases	Decreases
Breathing Rate	Increases	Decreases
Adrenal Glands	Secrete Adrenaline	Inhibits Adrenaline
Pupils	Dilate	Constrict
Digestion	Decreases	Increases
Sweat Glands	Increase sweat	Decrease sweat
Bladder	Muscles weaken	Muscles constrict

2. The sensory input refers to any information detected by sensory organs such as the eyes (seeing the car heading towards you), or the ears (hearing the car engine as it approaches) as well information detected by sensory neurons regarding the internal environment, such as increased heart rate, erratic breathing, sweatiness or shaking. This information is sent to the brain to process.

3. Once the information was processed by the brain, an appropriate response is determined which is delivered to the muscles and glands via the motor neurons. This would be to check your blind spot and change lanes.

4. If someone suffered an injury to the spinal cord just below the neck, there is a high chance that the injury would be immediately fatal. If the victim survives, they may suffer from quadriplegia, which is a lack of somatic control over the muscles in the arms and legs. Their autonomic nervous system would continue to function.

5.

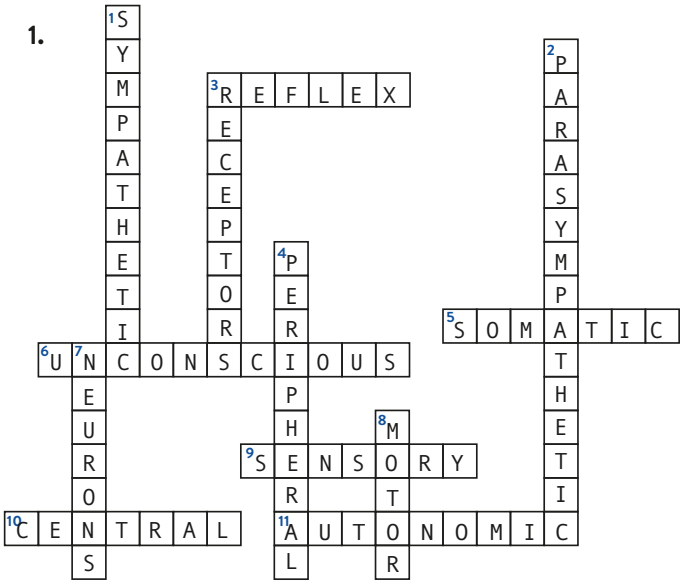
Scenario	Nervous system branch
Riding a surfboard	Both
Sweating before having to make a presentation	Autonomic
Turning the pages of a book	Somatic
Experiencing a dry mouth	Autonomic
Ducking due to a stray tennis ball	Somatic

Checking for Understanding (Page 52)

	T	F
Receptor cells detect changes in the environment.	X	
Heartrate is under conscious control.		X
Digestion is under unconscious control.	X	
Thermoreceptors are a type of sensory cell.	X	
Memory influences the way sensation is perceived.	X	
Motor neurons send information to the brain.		X
The spinal cord is made up of peripheral nerves.		X
The peripheral nervous system surrounds the spinal cord.	X	
The somatic nervous system controls voluntary actions.	X	
The sympathetic branch is dominant during rest.		X
Heart rate increases during the Fight or Flight response.	X	
The sympathetic branch works faster than the parasympathetic.	X	

Checking for Understanding (Page 52)

1.



2.

The Central Nervous System is composed of the **brain** and the **spinal cord** while the **Peripheral** Nervous System is all other nerves.

The **Somatic** Nervous System controls all voluntary muscle movement, while the **Autonomic** Nervous System controls all **involuntary** actions.

The **Fight** or **Flight** response is controlled by the **Sympathetic** Nervous System. The **Parasympathetic** Nervous System works to calm the body down after danger has passed.

3.

Increase: Digestion, salivation

Decrease: Heart rate, adrenaline secretion, blood pressure, breathing rate, sweat production.

4.

This is a reflex response caused by the doctor tapping the nerves in the knee. Reflex responses are coordinated by the spinal cord rather than the brain, meaning that they occur rapidly, but are poorly controlled. The lack of control over the movement of his leg, meant the patient kicked the doctor in the face.

Checking for Understanding (Page 54)

1. D
2. A
3. B
4. B
5. D
6. D
7. B
8. B
9. D
10. C
11. C
12. B

Topic 2.2

Checking for Understanding (Page 58)

1.

A: Cell Body
B: Nucleus
C: Dendrites
D: Myelin
E: Axon
F: Axon Terminal

2.

Definition	Structure
Known as the soma, contains the nucleus and mitochondria	**Cell Body**
The protrusions that receive a message from another cell	**Dendrites**
The part that contains the DNA of the neuron	**Nucleus**
The fatty insulation that keeps the electricity inside the cell	**Myelin**
The protrusions that pass a message on to another cell	**Axon Terminals**
The long tail along which the electrical signal moves	**Axon**

3.

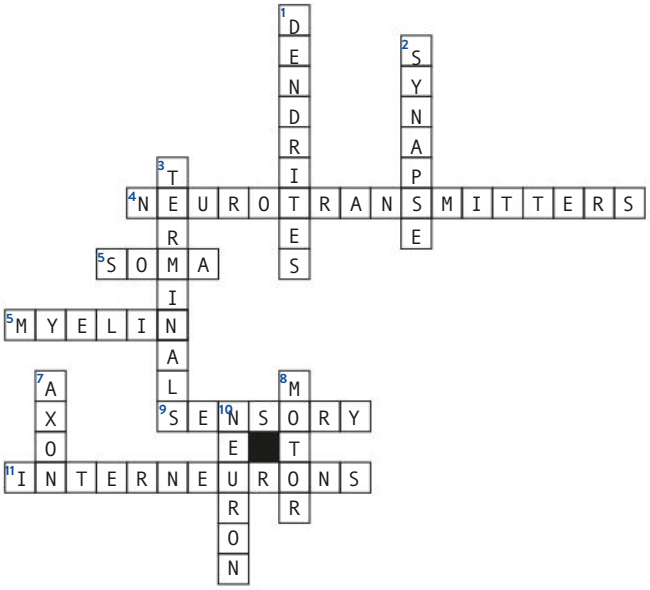
The neuron is the longest cell in the body which allows it to carry messages over long distances. The structure of the axon provides this function. The dendrites surrounding the soma increase surface area and allow for connection with many other neurons. The myelin surrounding the axon ensures that the electricity is insulated, and message maintains its integrity.

4.

The myelin sheath insulates the axon of the neuron, ensuring that the electrical message moves efficiently along the neuron, without information being 'lost.' In sufferers of multiple sclerosis, the myelin sheath is damaged which slows down the transmission of the electrical message along the axon, causing poorly coordinated and weak responses from the muscles.

Multiple Choice Questions

1. A
2. A
3. D
4. C
5. C
6. D
7. A



EXTENSION ACTIVITIES – FURTHER RESEARCH

a) Synaptogenesis refers to the formation of synapses, which are connections between neurons. These are necessary for communication and information processing in the brain. This occurs in abundance during the early stages of one's life – infancy and childhood.

b) Dendritic arborisation refers to the branching structure of dendrites that surround the soma. The function of these branches is to maximise surface area and connections between neurons to ensure the efficient transmission of neural messages.

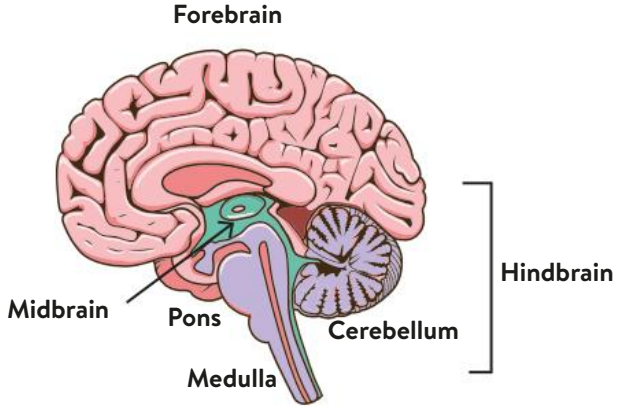
Topic 2.3

Checking for Understanding (Page 62)

The brain is protected by both the skull and the cerebrospinal fluid in which it floats. The skull protects the brain from direct hits to the head, or penetrating injuries, while the cerebrospinal fluid cushions the brain from direct contact to the skull if the head is knocked.

The hindbrain is essential for maintaining vital bodily functions, regulating involuntary processes, coordinating movements, and ensuring balance and posture.

Checking for Understanding (Page 65)



Checking for Understanding (Page 71)

1. The hindbrain, particularly the medulla, controls crucial autonomic functions such as breathing, heart rate, blood pressure, and digestion. These functions are necessary for the body to maintain homeostasis and sustain life.

2. While the exact cause of Multiple Sclerosis is not known, it is believed to be an auto-immune disease with genetic links. It triggers the breakdown of myelin surrounding the axon, causing neural messages to be inhibited in their transmission.

3. The main purpose of the gyri and sulci are to maximise the surface area of brain tissue, to allow a larger number of neurons to fit into the space within the skull.

Checking for Understanding (Page 74)

1. D
2. A
3. B
4. D
5. C
6. D
7. G
8. A
9. C
10. C
11. B
12. D
13. A
14. B

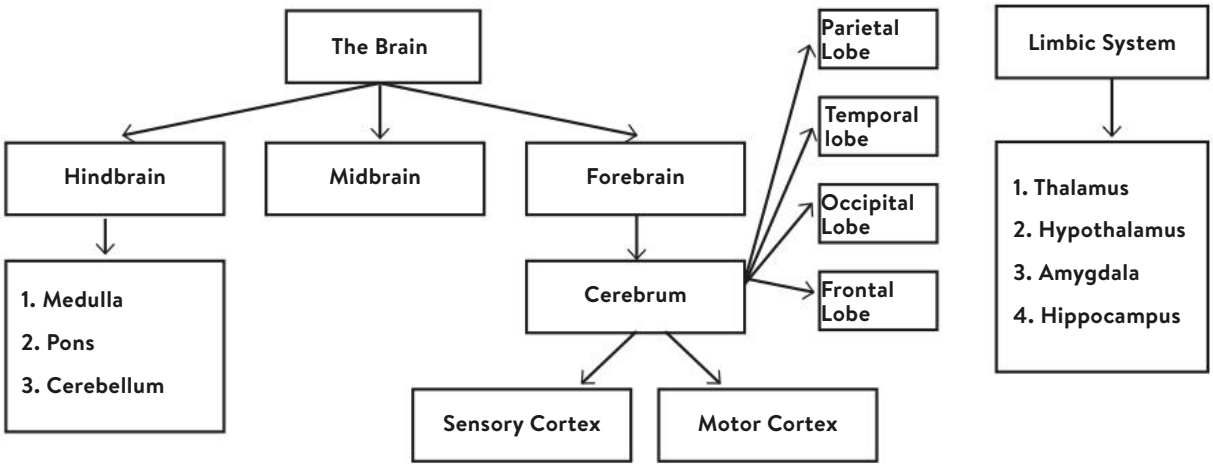
Down:

1. Hypothalamus
2. Temporal
3. Hindbrain
6. Myelin
7. Cerebellum
11. Occipital

Across:

4. Cerebrum
5. Frontal
8. Amygdala
9. Parietal
10. Endocrine
12. Limbic

15. Cerebrum
16. Control of emotion, language difficulties, limited executive functions.
17. The limbic system is a combination structures that control emotion.
18. Stephen could suffer from paraplegia in his legs. This means that he would lack voluntary control and would have limited movement.
19. Broca's area.
20. Broca's area controls the production of sensible and fluent speech.



Topic 2.4
Checking for Understanding (Page 81)

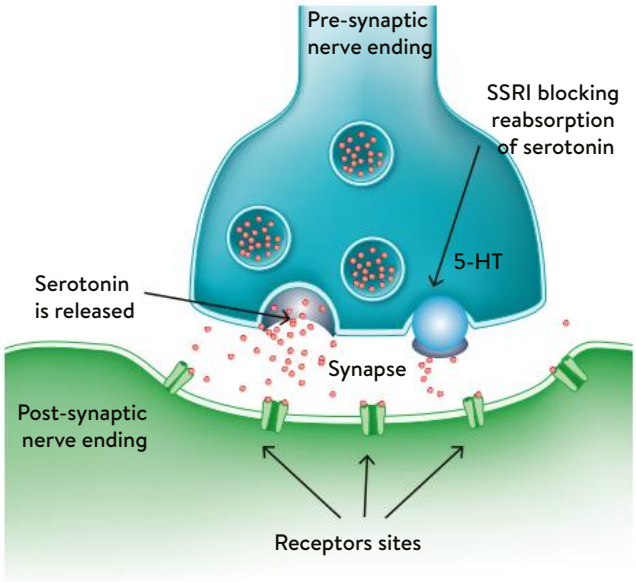
1. The graph shows that nicotine use can cause dopamine to be increased by up to 200% compared to the normal level in the bloodstream. However, it can also fall to only 80% of normal levels after using nicotine.

2. GVG increases GABA which lowers the amount of dopamine in the brain. When GVG is present, cocaine only raises the level of dopamine to 200% of the normal level, compared to an increase of 500% without GVG present. 500%

3. No. Apart from GVG being synthetic, it also maintains a lower level of dopamine in the brain. This would not be helpful because dopamine is necessary for maintaining a positive and calm mood.

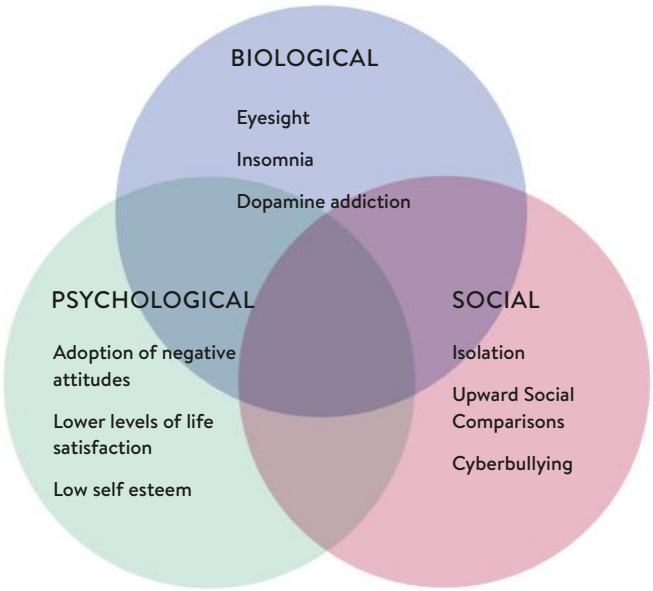
4. Even though nicotine can increase brain dopamine levels by 200%, levels then fall to only 80% of normal amounts of dopamine.

5.



6. Oxytocin manages key aspects of both male and female reproduction, particularly labour and lactation in females. It also plays a role in interpersonal bonding, especially between mother and child.

7. Cortisol: Peaks around 9am, decreases throughout the day and is at its lowest level around midnight. It then increases again throughout the early hours of the morning. **Melatonin:** Is at its lowest level around 6am and remains at low levels until approximately 6pm. After this, melatonin begins to increase, and peaks between midnight and 2am. It decreases again in the early morning hours.



Topic 2.5
Checking for Understanding (Page 86)
1. Amygdala, Thalamus, Hippocampus, Prefrontal Cortex, Nucleus Accumbens

2. Medication is commonly used to treat depression because it has been found to be highly effective, and it also works quickly to reduce or alleviate symptoms.

3. Electroconvulsive Therapy may be used as an option to treat mental health issues when other methods of treatment, such as medication or therapy, have not been effective.

4. Optogenetics is considered unethical by some because it is a type of genetic engineering. This means that permanent changes to DNA sequences are made. Additionally, the intrusive nature of this treatment method is concerning.

Topic 2.6
Checking for Understanding (Page 88)
Informed Consent: Patients must be informed about the risks or side effects of their treatment, as well as the success rate and predicted improvements. This will allow them to make an educated decision about whether or not they choose to engage with the treatment option.

Withdrawal Rights: Even if a patient has initially consented to undertaking a type of treatment, or participating in scientific research, they must be allowed to withdraw from the procedure or treatment as soon as they express the desire to, without any negative consequences.

Confidentiality: Individual results must be kept confidential, and only referred to anonymously in literature. Additionally, any diagnostic information disclosed to mental health professionals must also be kept confidential.

Voluntary Participation: Participants who volunteer for scientific studies or trials must be volunteers. They cannot be coerced, bribed, or intimidated. While payment for their time may be offered, this payment cannot be excessive.

Psychological Harm: Whether a patient is utilising a treatment method, or engaging in mental health research, their psychological wellbeing should be considered at all times, and any psychological harm minimised. If psychological harm becomes evident, the participant should be withdrawn.

Deception: Researchers and mental health professionals cannot deceive their patients about the side effects, risks, or success rate of potential treatment options.

Topic 3.2
Science Inquiry Skills - Checking for Understanding (Page 118)
1. Mixed methods – Longitudinal and experimental

2. 60 12-month-old infants from Japan

3. The original strange situation protocol was followed. That is, the infant's behaviour upon reunion with its mother was observed following two distinct separations. This same procedure was then followed at subsequent timepoints of the 16th and 23rd months of the babies' lives.

4. That Japanese infants showed different patterns of attachment than did the original American infants. Specifically, they became much more distressed at the separations.

5. No. As outlined above, the Japanese infants experienced significantly higher feelings of distress.

6. The researchers, when they classified the infants using the original criteria found no insecurely attached infants of the A type. If Type A infants exist in Japan, incorporating these into the study could have improved the robustness of the results. It is somewhat unclear how sampling occurred. If it was random sampling and the participants are therefore a true representation of Japanese culture, this gives us further information to suggest that possibly our understanding of attachment is culturally bound. Replication is needed.

Science Inquiry Skills - Checking for Understanding (Page 119)
1. Quantitative observational – Bowlby looked at information that was already present. There was no manipulation of data.

Topic 4.1

Checking for Understanding (Page 143)

1. Example: Fear. When experiencing fear, some physiological changes include an increase in heart rate and blood pressure, the secretion of adrenaline, the use of stored glucose, dilated pupils, bronchi and blood vessels, and a decline in the rate of digestion.

2. The social value in recognising and interpreting the emotions in others is that these skills allow for empathy to occur, and relationships to be formed, allowing humans to bond over shared experiences and understandings.

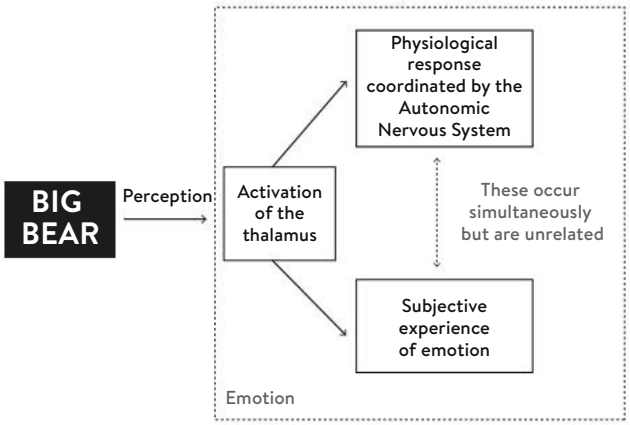
3. Physiological changes that occur in response to a long-term emotional state include mental health issues such as depression and anxiety, high blood pressure, cardiovascular disease and stomach ulcers. Poor anger management has also been linked to digestion problems and eczema.

Checking for Understanding (Page 163)

	T	F
Subjective feelings are experienced by everyone in the same way.		X
Physiological responses refer to changes occurring in the body.	X	
Emotional states can be long-term as well as short-term.	X	
Emotions require a stimulus to trigger them.	X	
Suppression refers to purposely bringing forward an emotion.		X
Expressive behaviours are always conscious.		X
Facial expressions are the most widely used form of expressive behaviour.	X	
Subjective feelings are easily observable.		X
Sadness is a universally recognised emotion.	X	
A polygraph accurately measures if someone is lying.		X
Control questions are used to determine a baseline level of arousal.	X	

Checking for Understanding (Page 149)

1. The James-Lange theory suggests that our emotions come from our body's response, while the Cannon-Bard theory says our body's response and our emotions happen simultaneously but on their own.



Science Inquiry Skills (Page 150)

1. Random allocation of participants to groups, Schacter and Singer had control over the independent variable, a cause-effect link was determined.

2. Schachter and Singer administered a placebo to Group 4 so that they could determine the response caused by the injection itself, rather than the contents of the syringe. This would then help them determine the effect of the adrenaline on emotion in the other three groups.

3. The dependent variable was the interpretation of emotion as reported by the participants.

4. The reliability of these findings was limited because when the experiment was replicated, the same results were not obtained.

Checking for Understanding (Page 152)

1. Trust could aid survival because it allows for positive relationships and cooperation. Cooperation can lead to stronger communication, concern for others in the same social group, and resource sharing.

2.

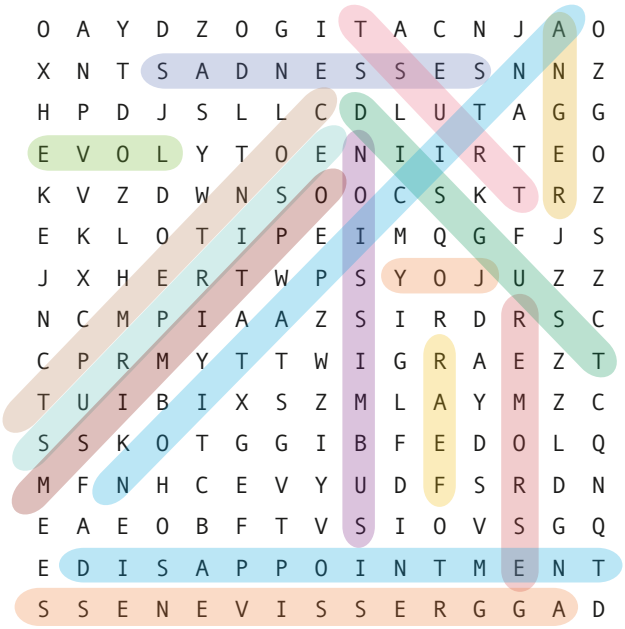
a) Remorse
b) Contempt
c) Submission

3. Emotions that cannot occur at the same time include Ecstasy and Grief, Admiration and Loathing, Terror and Rage, Amazement and Vigilance.

4.

a) Interest → Anticipation → Vigilance
b) Pensiveness → Sadness → Grief

c) Distraction → Surprise → Amazement



5.

Topic 4.2

Checking for Understanding (Page 156)

The limbic system is a series of structures within the brain that process emotions. The hippocampus forms memories associated with emotion. The amygdala sends the signal to the hypothalamus to initiate the fight or flight response. The hypothalamus converts emotions into physiological reactions. It responds to input from the amygdala by activating the adrenal gland to produce both adrenaline and cortisol.

Checking for Understanding (Page 157)

The term 'Display Rules' refers to the social norms within a society or culture that dictate the way emotion is expressed and with what level of intensity. A number of studies have found that Western cultures are more open in their expression of emotion, both publicly and privately, while those from Eastern cultures are more likely to suppress their emotions to ensure their response is suitable and aligned to those around them.

Checking for Understanding (Page 158)

Rachel Jack suggested that, in her studies into the interpretation of facial expressions, participants were more easily able to detect small changes in the faces of people from their own race or culture.

Checking for Understanding (Page 159)

	T	F
Expressive behaviours are identical between cultures.		X
Social Display Rules determine appropriate gestures and body language.	X	
The Limbic System processes emotions.	X	
Eckman considered Love a universal emotion.		X
Eye contact display rules differ between cultures.	X	
We are more successful in recognising facial expressions in people of our own culture.	X	
The most effective communication type is aggressive.		X
Anger is a natural and healthy emotion.	X	

2. Differences in the expression of emotion can be seen in a number of studies outlined in this chapter.

Matsumoto (1990) found that Japanese individuals tend to only express negative emotions while alone, while Americans also expressed them in public. This finding was also reflected by Tsai's study (2002) comparing European and Hmong Americans.

Briggs (1960s) found that Inuit people ostracized people who showed aggression or anger in public.

Kroeber and Kluckhohn (1952) determined that children's picture books published in America featured characters experiencing intense and exciting emotions, which books published in Taiwan did not.

Jack's study (2011) revealed that people from different cultures rely on different facial features to interpret emotion. Caucasians rely on changes in the eyebrows and mouth, while Chinese participants relied on the eyes.

Akechi (2013) found that Asian people were more likely to regard someone demonstrating direct eye contact as aggressive or unapproachable compared to their Western counterparts.

Science Inquiry Skills (Page 163)

1. The images shown are depicting poses that demonstrate a connection between people. If the images are standing close together, in a position where body contact is occurring, participants will determine that there is rapport between the individuals.

2. This would be considered an observation, as the investigator does not have control over the independent variable (gender) and cannot randomly allocate participants to groups.

3. There would be many extraneous variables that could limit validity, including the personality types, past experiences, gender, culture, or attitudes of the participants. Their understanding of social norms, culture, and the experience of any neurodivergence such as autism could also impact results.

Topic 4.3
Checking for Understanding (Page 167)
There are many examples of how technology can be used to regulate emotions. Playing games such as Wordle or Candy Crush can be relaxing, while listening to music can enhance positive emotions or reduce feelings of stress. There are also a range of applications that can assist with gratitude journalling, mindfulness, or meditation. Use of smartwatches and other biofeedback devices can track physiological indicators of stress, and often include timed breathing apps that can lower arousal levels.

Checking for Understanding (Page 168)
Social Media can be used in many ways to enhance self-expression and creativity:

- Sharing photos
- Sharing images of locations, issues, people or interests.
- Joining groups with other individuals who share the same interests, passions or advocacy.
- Using social media as a way to share or advertise one's music, artwork etc.
- Using the 'like' button, GIFs or emojis to share emotions.

Science Inquiry Skills (Page 169)
1. This study is considered an experiment because the investigator had control over the independent variable (social media usage) and randomly assigned participants to groups. Extraneous variables were controlled, and a cause-effect link can be determined.

2. Participants in the control group were allowed to use their social media as usual.

3. The qualitative, subjective data could have been obtained through the use of a Likert scale (a numbered scale on which participants indicate their level of agreement to a range of questions about their personal experience).

Topic 4.4
Checking for Understanding (Page 172)
1. Sufferers of OCD experience the emotion of anxiety more readily than people without OCD. The experience of anxiety causes them to engage in repetitive behaviours (compulsions) in an attempt to control their irrational thinking (obsessions). Attempting to ignore the obsessions can heighten the emotion of distress or fear.

2. OCD is considered an anxiety disorder because the unwanted and irrational thinking patterns cause feelings of stress and discomfort, which can extend to the experience of fear. It is considered a disorder because the obsessions are irrational and often without trigger, and the compulsions inhibit the sufferer from living their life the way they want to.

3. Anatomical differences in the brain, imbalances in neurotransmitters, genetics, past experiences, personal beliefs, personality traits, childhood maltreatment, culture, religion.

4. Biological: Anatomical differences in the brain, imbalances in neurotransmitters, genetics.
Psychological: Past experiences, personal beliefs, personality traits.
Social: Childhood maltreatment, culture, religion.

	T	F
Every sufferer of OCD experiences the same symptoms.		X
Compulsions refer to behaviours undertaken to calm anxious thoughts.	X	
There is no single cause of OCD.	X	

Checking for Understanding (Page 174)
1. Nomophobia is the irrational fear of being without a mobile phone. It refers to the emotional and psychological dependence on smartphones or the fear of being disconnected from technology.
Apart from setting healthy boundaries and time limits, and exercising self-control when using mobile phones, if nomophobia develops, clinical intervention may be necessary in the form of Exposure and Response Prevention or Cognitive Behavioural Therapy.

ERP involves purposely evoking the anxiety associated with not having access to a mobile phone, and then restricting the patient from being able to access one. Over time, the patient learns to tolerate and manage their fears.

Cognitive Behavioural Therapy works by teaching the sufferer to identify their irrational thinking patterns, challenge them as being unnecessary and unhealthy, and replace them with rational thinking such as "I don't need to use my phone right now." Over time, the obsessive behaviour will also be reduced.

2. A simple fear has a rational stimulus, and the emotion of fear will cease when the trigger is removed. A phobia is a type of anxiety disorder where the fear experienced is unrealistic and out of proportion to the potential harm of the trigger.

3. A phobia may begin due to a negative first encounter with the trigger of the fear. This fear is then generalised so that the sufferer develops irrational anxiety to all iterations of the trigger, which becomes persistent and excessive.

4. Someone suffering from a phobia experiences persistent and excessive fear which is unrealistic and out of proportion to the trigger. People who do not suffer from a phobia may feel anxiety or fear when confronted by certain stimuli, but the emotional response is rational, and subsides when the trigger is removed, or they leave the situation.

Sufferers of OCD may also experience panic attacks, which are brief episodes of intense anxiety with a range of physiological sensations such as increased heart rate and shortness of breath. To avoid anxiety attacks, sufferers may engage in avoidance behaviours which may restrict their ability to live a normal life.

Checking for Understanding (Page 178)

1. Cognitive Behavioural Therapy teaches patients to identify their negative and irrational thinking patterns, and practice actively challenging and changing them. This will also lead to a change in associated behaviours.

2. Differences in anatomy of limbic system structures, lower levels of neurotransmitters including serotonin, genetics, physiological illnesses, personality type, stress levels, trauma, aging.

3. People with bipolar disorder experience episodes of extreme mood swings, shifting between periods of elevated or manic moods and periods of depressive or low moods. This differs from people without bipolar disorder, whose moods are generally more stable, and only change based on rational triggers.

Checking for Understanding (Page 182)

Psychological: Historical trauma, feelings of oppression, beliefs relating to culture bound syndromes such as 'being sung,'

Social: Poverty, unemployment, lower levels of education, over-representation in the prison system, forced assimilation, lack of access to services, longing for country, wrong way relationships.

Checking for Understanding (Page 183)

1. One key difference is the **intensity and duration** of symptoms. Sufferers of mental health and mood disorders experience negative emotions with greater intensity and for longer duration. Another key difference is **impairment in functioning.** Emotional intensity becomes problematic when it affects an individual's daily life. People with mental health and mood disorders also meet the criteria listed in the DSM-V, while people experiencing intense emotions occasionally, and without negative impact, do not.

2. Obsessions refer to the negative, irrational, and persistent thinking patterns experienced by sufferers of OCD, while **compulsions** refer to the behaviours performed in an attempt to quieten the obsessions.

3. Biological advantages to exercise include the release of endorphins, the reduction of cortisol and adrenaline in the body, as well as the maintenance of healthy levels of serotonin and dopamine.

Psychological advantages include increased feelings of happiness and motivation, as well as improved self-esteem. It may also reduce the chance of an individual adopting maladaptive coping strategies or engaging in rumination and negative thinking.

If exercise occurs in a group or with a workout partner, social interactions are also enhanced, which is a known protective factor against depression.

4. Focus groups allow for small groups of participants to discuss key ideas or answer posed questions related to the topic of research. They encourage open communication that provides depth and detail to participants' thoughts, feelings and opinions. A focus group is cheap and easy to organise and can quickly yield a great deal of useful data to the researcher. They allow participants to consider the viewpoints of the other volunteers, which often strengthens their own views, or encourages thoughtful discussion amongst the group. In Westerman's research a focus group could have been a better research tool than a survey or questionnaire, as these are often limited to participants who can read or write English.

Topic 4.5

Checking for Understanding (Page 185)

1. The independent variable can be manipulated by the investigator. Participants can be randomly allocated to groups. There is increased control over extraneous variables. The method can be replicated. A cause-effect link can be determined.

2. Current mood or personality type could have influenced the type, duration or intensity of emotion experienced by the participant. IQ, intelligence type or the social inhibition could have influenced the problem-solving ability of the participant.

Checking for Understanding (Page 186)

1. One advantage of conducting an observation is that, in some cases, participants can remain in their natural setting, which leads to more authentic behaviours being

observed. Observational studies can also bypass some ethical considerations because the independent variable is not being actively applied by the investigator.

2. One limitation of conducting an observation is that the investigator does not have control over the independent variable, or extraneous variables. This limits validity and reliability. Because of this, a cause-effect link cannot be formed – only a correlation between the independent and dependent variables. Additionally, participants cannot be randomly allocated to groups, and replication of the investigation is more difficult.

3. There are a range of options here: Any investigation where application of the independent variable may breach the ethical guideline of physical or psychological harm. **For example:** How does growing up in extreme poverty impact success in education?

Checking for Understanding (Page 188)

	Qualitative	Quantitative
Fatimah has an IQ of 134.		X
Amber describes art as 'satisfying.'	X	
Nate considers himself a 'happy' person.	X	
Daniel indicated that his current self-esteem value was 8 out of 10.		X
Year 12 students have an average ATAR of 80.6 points.		X
Diezel thinks that the government should offer more support to Asylum Seekers.		X
Noah appears scared when confronted by bullies.		
The investigator tallied 14 aggressive behaviours while watching children play.	X	
The heart rate monitor showed 73 beats per minute.	X	
The doctor explained the symptoms of OCD.		X
Soldiers with PTSD participated in a focus group.		X

Checking for Understanding (Page 189)

1. Physiological Response: She began to shake, heart rate increased, eyes filled with tears.
Subjective Feelings: Experiencing gratitude and love.
Expressive Behaviour: Her jaw dropped, running to give Dad a hug.

2. Student responses will vary, but could include:
Physiological Response: Feeling cold, reduced levels of energy, difficulty sleeping, feeling sick, eyes filling with tears, shaking.
Subjective Feelings: Experiencing despair, grief, regret, disappointment etc.
Expressive Behaviour: Crying, facial expressions, body language, withdrawal or isolation.

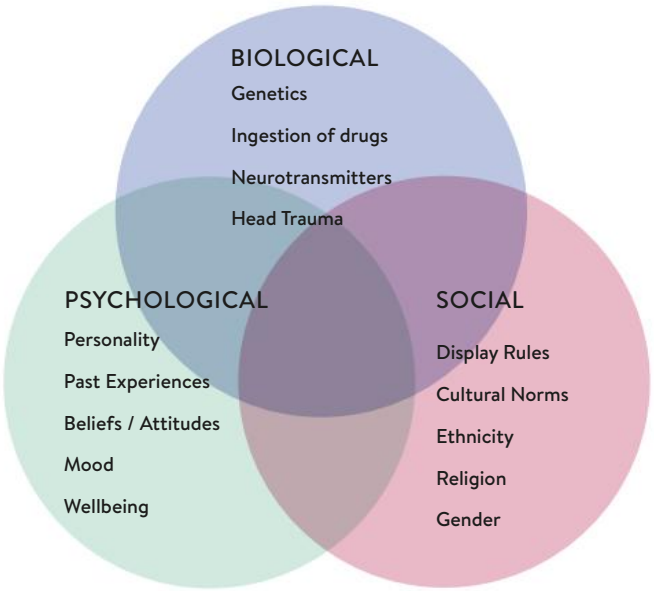
3. The man shown is experiencing anger. The characteristics of his facial expression that show this include a furrowed brow, eyebrows pulled inwards, eyes are showing an intense gaze, nostrils are flared, and facial muscles are tense.

4. Recognising microexpressions when having a conversation with your parents is valuable because it may reveal their true emotions, even if they are attempting to mask them. For example, you may note that there is concern or fear behind their anger or recognise when they are feeling guilty or ashamed.

5. Validity refers to accuracy of measurement. The polygraph machine claims to accurately measure lies. However, the physiological arousal associated with lying can also be caused by other emotions such as fear or surprise. Therefore, while the polygraph may detect changes in physiological arousal, these changes may not be caused solely by lying.

6. According to the Schachter-Singer model, physiological arousal is experienced first, followed by a cognitive appraisal of the situation. This leads to the experience of emotion. When achieving an A for a Psychology test, physiological changes could be shaking, an increase in heart rate or quickened breathing. The brain would then interpret the situation of achieving an A, and together with the existing arousal, determine that the emotion of happiness is being experienced.

7.
a) Serenity, Joy, Ecstasy
b) Trust
c) An example of a secondary emotion is Remorse. It is a secondary emotion because it is a combination of two primary emotions – Disgust and Sadness.
d) In Plutchik's colour wheel, the depth of colour corresponds with the depth of emotional intensity. For example, Admiration is shown as a darker colour compared to Trust because it is experienced with greater emotional intensity.



9. One example of a display rule in Australia is the phenomenon known as 'Tall Poppy Syndrome.' This social norm dictates the display rules for modesty and self-promotion. It is expected that Australians might downplay their achievements, show humility, and avoid excessively showing off their successes to conform to this cultural norm. They may use self-deprecating humour or be modest when discussing personal achievements, even if they feel a sense of pride internally.

10. In the image below emotion can be interpreted in the following way:

The male is sitting up straight with a rigid spine, indicating that he is experiencing anger or annoyance. His arms are crossed over his chest which may mean that he is not inviting communication or is feeling defensive. His leg is crossed away from the woman, which is an element of a closed posture that does not invite her to move any closer to him. The woman is sitting in a hunched posture, with her head down. This indicates feelings of sadness, regret, or disappointment. She also has a closed posture which is not conducive to communication between the pair. Her head is resting in her hand which may represent feelings of defeat. Her leg is also crossed away from the man. Neither the man nor the woman is making eye contact with one another. He is purposefully staring into space, while she has her eyes partially closed, directed downwards.

11. Discussion could include reference to the use of music playlists such as Spotify, the use of gaming as distraction from negative emotions, the use of mental health apps that encourage mindfulness or gratitude etc.

12. Biological outcomes include heightened chance of obesity, addiction due to dopamine release, eyesight problems, weakened bones and difficulty sleeping.
Psychological outcomes include experiencing mental health issues such as depression or anxiety, change in beliefs or attitudes due to online interactions, lower levels of resilience and lower self-esteem.
Social outcomes include withdrawal, isolation, breakdown of family relationships, a decline in communication skills and potential cyberbullying.

13. Emotion is experienced differently in sufferers of OCD because they experience frequent, heightened levels of anxiety and distress due to the frequency of their irrational and stressful thinking patterns that cause them to perform compulsions in the attempt to reduce them. The anxiety experienced by sufferers of OCD is of greater intensity and for longer duration. It is much harder to control than the experience of brief anxiety in a person who does not suffer.

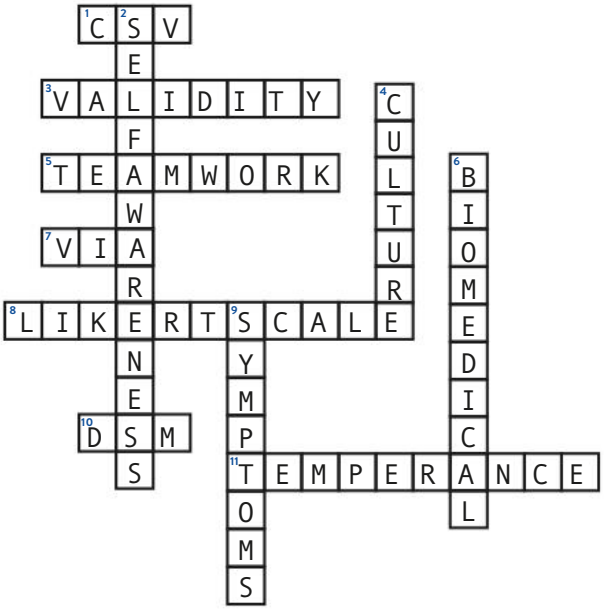
14. Exposure therapy is a helpful treatment for phobias. It works by gradually exposing people to their fears in a safe way. The goal is to reduce anxiety and fear by helping them face their fears little by little until they become less scared. This helps them get used to their fears and feel more in control.

15. Biologically depressive disorders can be treated with anti-depressant medication, such as SSRIs. Exercise can also be used to treat depression due to the way in which in encourages the release of endorphins, regulates serotonin in the brain, and actively reduces levels of adrenaline and cortisol.
Psychologically, depressive disorders can be treated through therapy, specifically CBT. CBT teaches individuals to identify, challenge and change their depressive thinking patterns, which in turn changes their behaviour. CBT can be tailored to the individual to suit personal beliefs, attitudes, intelligence levels, resilience levels and past experiences.
Socially, depressive disorders can be treated through the use of support groups, or by encouraging the sufferer to form social support networks with others as a protective factor against depression.

16. Informed Consent: People suffering from emotion disorders may not have the cognitive ability to process information about the suggested treatment options or may not recognise the potential risks or advantages. It is important for the professional to explain these clearly to ensure the participant is able to provide informed consent.

Withdrawal Rights: Sufferers of emotion disorders may not recognise when they need to withdraw themselves from research or a particular treatment process. Because they are vulnerable, the responsibility falls to the investigator to instigate the withdrawal process when it is necessary.
Voluntary Participation: Sufferers cannot be coerced into participating in a research study or undertaking a particular type of therapy or treatment. The limitations and benefits should be explained without bias, persuasion, or negative repercussions for selecting one type of treatment over another.
Confidentiality: The mental health professional must not share or publish information about the patient, their disorder, or the efficacy of the treatment program without express permission from the patient first.
Topic 5 answers

Topic 5.4
Crossword activity, page 218:



Checking for Understanding, page 230: Psychological, present, anxiety, Eastern, gratitude, effectiveness, positive, cultures, placebo.

Answers to the Myth buster quiz, page 231:
1-5 are all False

Answers to CBT tasks, page 233:
Task 1:
1. Sarah's procrastination:
Cognitive components: Limiting beliefs about her ability to complete assignments on time, negative self-talk that undermines her motivation to study.

Behavioural components: Poor time management and organizational skills, avoiding difficult or unpleasant tasks.
2. John's social anxiety:
Cognitive components: Negative beliefs about his social skills, fear of being judged by others.

Behavioural components: Avoiding social situations, withdrawing from social interactions, experiencing physical symptoms of anxiety.

3. Emily's loneliness and low self-esteem:
Cognitive components: Negative self-talk that reinforces her feelings of loneliness and low self-esteem.

Behavioural components: Avoiding social situations, withdrawing from social interactions, experiencing physical symptoms of anxiety.

4. Jack's attention and focus:
Cognitive components: Negative self-talk that undermines his ability to focus, negative beliefs about his ability to pay attention.

Behavioural components: Easily distracted by his surroundings, difficulty organizing and completing tasks, experiencing frustration and negative emotions.

Task 2.
1. Sarah's procrastination:
Cognitive aspects: Sarah may have limiting beliefs about her ability to complete assignments on time or negative self-talk that undermines her motivation to study. CBT can help her identify and challenge these beliefs and replace them with more positive and realistic thoughts.

Behavioural aspects: Sarah may need to develop better time management and organizational skills to break down her assignments into smaller, more manageable tasks. CBT can help her set realistic goals, develop a plan of action, and monitor her progress.

2. John's social anxiety:
Cognitive aspects: John may have negative beliefs about his social skills or fear of being judged by others. CBT can help him identify and challenge these beliefs and develop more positive and realistic thoughts about himself and others.

Behavioural aspects: John may need to gradually expose himself to social situations and practice social skills such as assertiveness and conversation skills. CBT can help him develop a hierarchy of social situations to gradually approach and learn new coping strategies.

3. Emily's loneliness and low self-esteem:
Cognitive aspects: Emily may have negative self-talk that reinforces her feelings of loneliness and low self-esteem. CBT can help her identify and challenge these thoughts and develop more positive and compassionate thoughts about herself.

Behavioural aspects: Emily may need to develop new social skills and practice social interactions with peers. CBT can help her learn new coping strategies and behaviours to improve her social connections and self-esteem.

4. Jack's attention and focus:
Cognitive aspects: Jack may have negative self-talk that undermines his ability to focus or negative beliefs about his ability to pay attention. CBT can help him identify and challenge these thoughts and develop more positive and realistic thoughts about his abilities.

Behavioural aspects: Jack may need to develop new study habits such as breaking down assignments into smaller, more manageable tasks, setting clear goals, and using positive reinforcement strategies. CBT can help him develop new coping strategies and behaviours to improve his concentration and academic performance.

Glossary

Abstract concepts	Refers to things that have no tangible, physical or spatial existence in the real world. For example, ethics and morality.
Abstract thinking	Refers to the ability to consider abstract ideas and concepts, or consider how something could be manipulated without the need to manipulate something in the physical world.
Accommodation	A more complex process than assimilation and occurs when we are not able to assimilate new information.
Action potential	A change in voltage across a membrane that is the fundamental unit of communication between neurons.
Adaptation	The process of using the environment to learn, and learning to adjust to changes that occur in the environment.
Adrenaline	A hormone secreted by the adrenal gland, initiates the Fight of Flight response.
Adrenocorticotropic Hormone (ACTH)	A hormone that triggers the adrenal gland to release cortisol.
Afferent nerves	Nerve fibres responsible for bringing sensory information from the outside world into the brain.
Alexithymia	The inability to recognise or describe one's own emotions.
Alzhiemer's disease	A disease where people experience an earlier than normal decline in thinking and learning due to biological changes in the brain.
Ambivalent—insecure attachment	A type of attachment in which a child feels insecure about their connection to their primary caregiver and therefore exhibits distress at the idea of being left by the caregiver.
Amnesia	The loss of memories such as information, life events and experiences.
Amygdala	An almond-shaped structure in the temporal lobe involved in the expression of fear. Part of the limbic system.
Anger management	A therapeutic program that teaches patients a series of strategies to control the intensity of anger.
Animism	Refers to when children give inanimate objects lifelike characteristics. For example, thoughts and feelings.
Anxiety disorders	A group of psychological disorders characterised by excessive fear or perceived threats, leading to physical symptoms.
Applied behaviour analysis	A type of therapy where a child works with a therapist to better understand and control their behaviour.
Ascending pathways	A nerve pathway that goes upwards from the spinal cord towards the brain.
Assimilation	Is the process of taking in new information and fitting it into and making it part of an existing mental idea about objects or the world.
Ataxia	Poor muscle control that causes clumsy voluntary movements.
Attachment	Refers to the psychological connectedness between people.
Auditory cortex	The part of the temporal lobe that processes auditory information.
Autism Spectrum Disorder	A neurological condition that affects how people interact, communication and learn.
Autonomic	Involuntary or unconscious.
Autonomy	Refers to an individuals sense of being able to achieve things independently and feeling that you have the ability to do things.
Avoidance behaviour	Any action that allows individuals to avoid an unpleasant stimulus or painful situation.
Avoidant insecure attachment	A type of attachment that is characterised by the child being emotially detached from the primary caregiver and self-reliant in nature.
Axon	The long, threadlike part of a nerve cell along which impulses are conducted.
Axon terminals	The button-like endings of axons.
Basal ganglia	A cluster of neurons that assist in the control of voluntary motor activity.

Biofeedback	The process of electronically monitoring an autonomic process within the body.
Bipolar disorder	A disorder that causes intense mood changes that negatively impact the patient's life.
Body image	Refers to the thoughts, feelings and ideas that an individual has about their body.
Body language	Conscious or unconscious movements, gestures and postures used to express emotion.
Brain derived neurotrophic factor	A protein vital to the survival, growth and maintenance of neurons.
Bunted / flat affect	The decreased ability to express emotion.
Calming	The process of attempting to relax and control one's internal responses.
Central executive	A function of the working memory that sorts visual from auditory information.
Cerebellum	The section of the brain responsible for conscious thought and the regulation of involuntary actions.
Cerebrospinal fluid	A clear, watery fluid found within the tissue surrounding the brain.
Circadian rhythm	Physical, mental and behavioural changes that follow a 24-hour cycle.
Classification	The process of grouping items into discrete categories based on shared criteria.
Clustering	A memory aid that involves putting smaller pieces of information into groups that are assigned a single retrieval cue.
Cognitive accomplishment	Refers to particular milestones that Piaget believed needed to be achieved at each stage of development, prior to moving to the next stage.
Cognitive behavioural therapy	A type of psychotherapy that teaches patients to identify negative thinking patterns, challenge them, and change them.
Cognitive decline	A decline in an individual's ability to learn, solve problems and use memory over time.
Cognitive interviews	A formal interview process following a structure suggested by psychologists to obtain more accurate eye-witness testimonies.
Compulsions	Repetitive actions undertaken in attempt to reduce anxious thoughts. Experienced as part of the anxiety disorder Obsessive Compulsive Disorder.
Concrete ideas	Ideas that are related to specific, tangible objects, people or places in the real world.
Conditioning	The process of learning through associations between temporily related stimuli.
Confirmation bias	The tendency for people to seek out information that confirms already held beliefs and ignore information that contradicts these.
Conscious	An organism's awareness of internal and external factors.
Conservation	The understanding that volumes of items remain the same, even when the shape of that volume is changed.
Consolidation theory	This theory states that new memories need time to be consolidated into our long-term memory.
Context-dependent cues	A type of retrieval cue where stimuli in our external environment form a link to when a memory was formed.
Contralateral neglect	The inability to pay attention to sensory stimuli on one side of the body.
Control questions	Questions asked by a polygraph operator to establish a baseline of physiological arousal.
Coordinate	The capacity of physical and mental processes to function together.
Cortisol	A hormone that regulates metabolism and the immune response, as well as being secreted in response to stress.
Cross-sectional studies	Studies that examine a particular variable at one time point in multiple populations.
Cultural norms	Shared rules or expectations of behaviour within a specifical cultural or social group.
Culture bound	Behaviours or practices specific to a unique culture.
Cushing's disease	A disease called by the over-secretion of the hormone cortisol.
Cyberbullying	The use of electronic communication to bully or threaten, usually through intimidatory messages or emails.
Decentred thought	The ability to understand that we do not need to believe all of the thoughts that enter our mind.

Dementia	A condition that is characterised by the loss of cogntive functioning, for example, thinking, remembering and reasoning, to such an extent that it impacts someone's daily life.
Dendrites	A branched extension of a nerve cell, projecting from the cell body.
Dendritic spines	Tiny protrusions from the dendrites that connect with neighbouring neurons.
Depression	A mood disorder that causes persistant feelings of sadness and loss of interest.
Depressive episode	A state of mind characterised by the symptoms of depression.
Descending pathways	A nerve pathway that goes downwards from the brain to the peripheral nervous system.
Despair	A feeling of hopelessness and that things are profoundly wrong and will not change for the better.
Detect	To identify the presence of.
Diagnostic and statistical manual of mental disorders	A handbook used by professionals as the authoritative guide to the diagnosis of mental disorders.
Disorganised-insecure attachment.	A type of attachment that develops when children are raised in an environment that creates fear and a lack of stability.
Displacement	When new information takes the place of older information in the short-term memory.
Display rules	A set of cultural norms in expressing emotion.
Distributed practice	Learning new information, then revisiting it at spaced intervals.
Dopamine	A hormone that controls movement and plays a role in the brain's reward system.
Double-blind procedure	A technique used in eyewitness identification where the suspect is not known to either the administrator or the eyewitness.
Dysarthria	A speech disorder caused by muscle weakness.
Ecological validity	Ecological validity examines, specifically, whether the study findings can be generalized to real-life settings; thus ecological validity is a subtype of external validity. Those studies considered to have high ecological validity means the results can be considered to have real life context and application.
Efferent nerves	Nerve fibres responsible for sending signals from the brain to the peripheral nervous system.
Ego-centric	The tendency to emphasise your own needs, wants and goals over those of others. This is normal in toddlers and small children, but is expected to lessen as people develop.
Elaborative rehearsal	Reorganizing information to be remembered in a new way.
Emotion	The simultaneous experience of a physiological response, subjective feeling and expressive behaviour.
Emotion Focused Therapy	A type of therapy where patients learn to recognise their emotions and express them in a healthy way.
Emotional disorder	A psychological disorder characterised by the inability to manage emotions that are disproportionate to the trigger.
Emotional lability	Rapid, uncontrolled and intense changes in mood.
Emotional regulation	The ability of an individual to exert control over their emotional state and the way their emotions are expressed.
Encoding	The processing of incoming sensory information to a form that can be stored as a memory.
Endocrine system	The glands and organs that create and secrete hormones into the bloodstream.
Episodic memory	A type of long term memory that allows the recall of unique personal events, as well as the time and place it occurred.
Evocation	The summoning of an emotion or the memory that causes emotion to be experienced.
Explicit memory	A type of memory used when conscious effort is used to remember new information.
Exposure and response prevention	A type of therapy where patients are exposed to their obsessions without being able to perform the compulsions.

Exposure therapy	A type of therapy used for anxiety disorders that encourages patients to confront their fear in a systematic manner.
Expression	The way an individual conveys their emotional experience.
Expressive behaviour	Any action that communicates one's thoughts or feelings.
Eye contact	When two individuals look directly into each other's eyes as an important aspect of communication.
Eyewitness testimony	An account of events that occurred in a person's past, often used to corroborate events surrounding a crime.
Facial action coding system	A tool used for identifying and categorising facial expressions.
Facial expression	A form of nonverbal communication using one's facial muscles.
False negative	When a machine incorrectly identifies that a condition is not present when it is.
False positive	When a machine incorrectly identifies that a condition is present when it does not.
Family therapy	A type of therapy that enables family members to express and explore difficult thoughts and emotions safely.
Fear of missing out (fomo)	The anxiety experienced when a technology user feels that they may be excluded from social activity if they log off.
Fight or flight response	A physiological response that prepares the body to deal with a threat.
Focus group designs	Research where groups of participants are asked to discuss open-ended questions while these are recorded in some way.
Forebrain	The largest region of the brain that coordinates sensory processes and higher reasoning.
Forgetting curve	The shape of the graph showing recall over time which shows a rapid decline at first, then slower decline as time goes on.
Galvanic skin response	An increase in the sweatiness of the fingertips, caused by emotional stress.
Generativity	The engagement in acts that promote the wellbeing of others, usually younger generations, to help the long term development of individuals or humans broadly.
Gerstmann's syndrome	A cognitive impairment that caused by damage to the left parietal lobe.
Gestures	A movement of a part of the body, usually the hands or head, to express emotion.
Glia	The connective tissue of the nervous system.
Glial cells	Cells that hold nerve cells in place and help them function the way they should.
Goal directed behaviour	Behaviour that has a specific goal and/or is purposeful.
Gonatrophins	Any hormone secreted by the pituitary gland which stimulates the activity of the gonads.
Graphesthesia	The ability to recognise symbols when they're traced onto the skin.
Guilt	Feeling selfconscious and distress about your potential responsibility (real or percieved) for negative outcomes.
Gyri	A ridge or fold on the cerebral surface of the brain.
Hindbrain	The lower part of the brainstem.
Hippocampus	A complex brain structure deep within the temporal lobe associated with learning and memory. Part of the limbic system.
Hippocampus	The region of the brain associated primarily with memory.
Homeostasis	A state of balance within the body needed for optimal function and survival.
Homunculus	A representation of relative sizes of the sensory areas in the brain that correspond to particular sensory parts of the body.
Hypopituitarism	Total or partial loss of pituitary gland function.
Hypothalamus	A region of the forebrain that controls the Autonomic Nervous System. Part of the limbic system.

Idealistic thoughts	These are thoughts that emphasise spiritual and moral aspects in interpreting the environment around us.
Identity	The individuals sense of self, their understanding of who they are.
Identity confusion	When an individual is unclear about who they are and their place in life.
Implicit memory	A type of memory used when new information is learned unconsciously or without effort.
Imprinting	Is the process of animals forming an extremely close and dependent bond with the first animal they experience at birth.
Industry	Refers to an individual working hard to develop their skills in particular areas.
Inferiority	Refers to an individual feeling they are not able to undertake tasks or develop skills.
Information processing model	A model of human memory that likens it to a computer that involves processing and interpreting sensory information, making decisions, then choosing and executing a response.
Initiative	Refers to an individual attempting new tasks and to independently begin or develop activities for themselves or others to enjoy.
Integrity	A regular pattern of behavour that is consistent with the values held by the person.
Interference Theory	A theory that attempts to explain how the retrieval of information from the long-term memory can be impacted by similar information.
Interneurons	A neuron which transmits impulses between other neurons.
Interoreceptors	A sensory receptor that receives stimuli from within the body.
Intimacy	A type of interaction in which personal information and care is reciprocally shared between individuals.
Isolation	The state of being cut off from other people, it could be physically, emotionally, or both.
Kin	One's family and relations.
Leading questions	Questions posed to a person which may change the person’s account of events by suggesting ideas through particular wording.
Learning	The process of acquiring new knowledge that can be used in practical ways.
Level of processing	The extent to which the learning of new information is shallow or deep.
Lifespan psychology	The study of the psychological development of humans across the lifespan.
Limbic system	A set of brain structures that process emotions and coordinate emotional responses.
Logical thinking	The ability to consider problems in a clear, ordered and sequential manner.
Longitudinal studies	A type of research design that examines specific individuals at several different time points in their life.
Long-term memory store	The third stage of the modal model of memory where information that is important is stored over a long period of time.
Magnetic Resonance Imaging	A technique for producing images of the body by measuring the response of atomic nuclei to high frequency radio waves.
Maintenance rehearsal	The process of repeating new information on several occasions.
Major Depressive Disorder	A mood disorder that causes persistent feelings of sadness and loss of interest.
Manic episode	A state of mind characterised by high energy and euphoria.
Massed practice	Learning new information in one intensive session only.
Maternal deprivation	Refers to a lack of a mother, or other significant caring figure in the first years of a child's life.
Maternal privation	A term summarising the impact of separating a young child from its mother or significant carer in early life.
Mechanoreceptors	A sensory cell or organ that responds to stimuli such as touch or sound.
Medulla oblongata	The connection between the brainstem and the spinal cord.

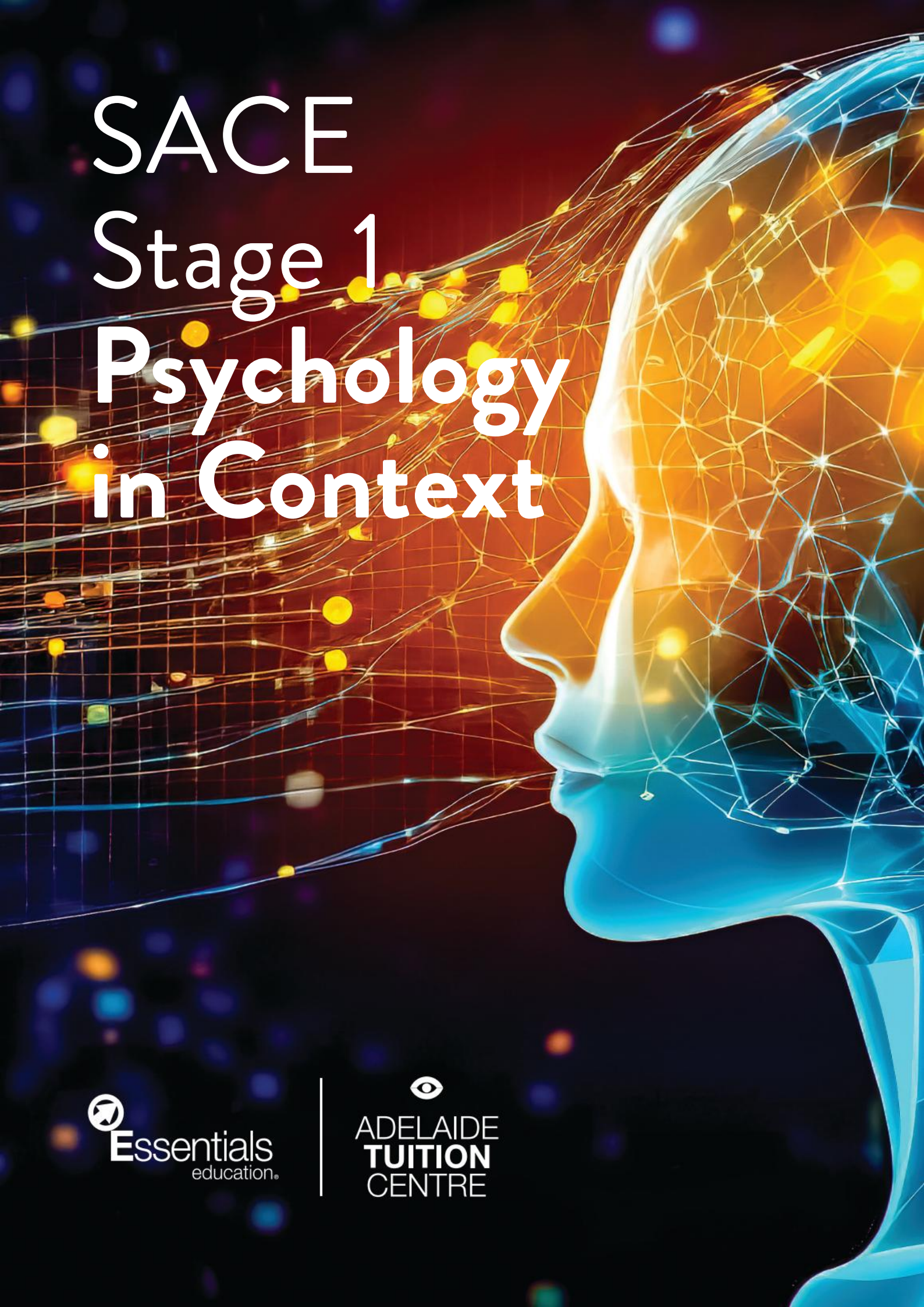
Melatonin	A hormone that the brain produces in response to darkness, to bring about drowsiness.
Meltdown	When someone becomes overwhelmed by the current situation and loses control of their behaviour.
Memory	The process of taking in sensory information, processing this information, storing it and being able to retrieve the information at a later time.
Memory technology	Any technology that is used to improve memory performance.
Meta-analysis	A type of research study that examines the findings of previous studies based on a particular are of study to determine common findings and/or contradictory findings. They also make comment on the validity and reliability of previously presented findings.
Method of loci	A memory aid that links new information to visually imagined objects which are then placed in specific positions along a known route.
Microexpression	A facial expression that lasts for a short moment only.
Midbrain	The topmost part of the brainstem connecting the brain and spinal cord.
Mistrust	A lack of trust in something or someone. One of the elements of Erikson's theory.
Mnemonics	Memorization strategies that use the underlying mechanisms of memory to aid recall of new information.
Modal Model of Memory	A theoretical structure of human memory including the sensory register, short-term memory store and long-term memory store.
Mood	A temporary feeling which can occur without apparent cause.
Moral reasoning	The consideration of the right and wrong behaviour for particular situations or events.
Motor cortex	The part of the brain involved in planning, controlling and executing voluntary movements.
Motor neurons	Cells within the nervous system that send commands to the muscles and glands.
Myelin	A fatty, white sheath that insulates the axon of a nerve.
Nature versus Nurture debate	A long raging debate about whether the greatest influence on human development is made by our genetics or our life experiences.
Nodes of Ranvier	Sections of the axon that are not insulted by myelin that allow for efficient impulse transmission.
Object permanence	The understanding that objects still exist, even when they are not being seen
Observational designs	Research methods that aim to study people or animals in their natural setting, where the independent variable is already pre-existing.
Obsessions	Unwanted anxious thoughts. Experienced as part of the anxiety disorder Obsessive Compulsive Disorder.
Obsessive compulsive disorder	A form of anxiety characterised by unwanted anxious thoughts (obsessions) and accompanying repetitive actions (compulsions).
Occupational therapy	A type of therapy in which a therapist helps a patient develop the skills necessary to complete everyday activities.
Olfactory receptors	A receptor used to detect odour molecules that stimulate the sense of smell.
Oppositional Defiance Disorder	A behaviour disorder where children exhibit anger, defiance and vindictiveness towards those in authority.
Optogenetics	A method for controlling a neuron's activity using light and genetic engineering.
Oral histories	Story-telling that passes on personal recollections and culturally significant ideas to others.
Overlearning	Any further learning that takes place after information can be recalled with complete accuracy.
Oxytocin	A hormone that stimulates uterine contractions in childbirth and lactation after childbirth.

Panic attack	A sudden, uncontrolled episode of intense fear that causes the physical sensations of fear.
Peg word	A memory aid that involves rhyming new information with objects that create a visual image as a retrieval cue.
Perception	The process of using sense organs to become aware of stimuli.
Perception	Our understanding of the world around us, based on the information provided by our senses, combined with our thinking about that information.
Peripheral nerves	Parts of the nervous system outside the brain and the spinal cord.
Phobia	A persistant, excessive and irrational fear of an object, event, person or place.
Phonetic processing	This occurs when only the auditory features of new information are focused on.
Phonological loop	The system that processes auditory information within the short-term memory or working memory.
Photoreceptor cells	A receptor used to detect light that stimulate the sense of sight.
Physical development	The development of our physical bodies as humans age.
Physiological response	The body's automatic response to a stimulus.
Piloerection	The reflex of producing goosebumps.
Pituitary gland	A pea-sized gland that regulates vital body functions.
Polar opposites	Emotions that sit across from one another in Plutchik's model and cannot be experienced simultaneously.
Polygraph machine	An instrument used to measure changes in human physiology.
Pons	The part of the brainstem that links the medulla and the thalamus.
Pontine stroke	A stroke affecting the pons in the brainstem.
Positron Emission Tomography	A type of imaging technology where positron-emitting isotopes are detected by gamma rays to reveal physiological processes.
Posture	The position in which someone holds their body. Can be used to express emotion.
Prefrontal cortex	Part of the cerebral cortex that contributes to the control of executive functions.
Preoperational stage	The second stage of Piaget's theory of cognitive development, during which symbolic thinking develops.
Primacy effect	The tendency for information near the beginning of a memory task to be recalled well.
Primary emotion	A set of emotions experienced and recognised across cultures with survival value.
Proactive interference	A type of retrieval failure that occurs when previously learned information interferes with information that was learned more recently.
Procedural memory	A type of memory used to recall skills, processes and actions.
Process	To perform a series of physical or mental steps.
Proprioception	Awareness of the position and movement of the body.
Protective factor	Refers to elements within an individuals life that help to 'protect' them from psychological harm. This could include being securely attached, having consistent love and support from those around you.
Proximity	The distance between two or more people.
Psychoevolutionary theory of emotion	Theorised by Plutchik. An evolutionary perspective that considers both primary and secondary emotions.
Psychosocial crisis	These are the turning points in each stage of development that individuals must go through. At these times, there is tension between their skills and the societal expectations
Psychosocial development.	Refers to personality and lifespan development that is influenced by social and cultural factors.

Qualitative designs	Research where people are asked to self-report their thoughts or feelings about specific topics.
Recency effect	The tendency for information near the end of a memory task to be recalled well.
Reflex arc	The nerve pathway involved in a reflex response.
Reflex response	A fast, but poorly coordinated response coordinated by the spinal cord.
Relevant questions	Questions asked by a polygraph operator about the investigation, designed to elicit an increase in arousal.
Retrieval cues	Stimuli in our environment that were present when a memory was formed that act to help us retrieve the memory from long-term storage later.
Retrieval failure	A phenomenon that occurs when we do not have the correct retrieval cues to access information stored in the long-term memory.
Retrieving	The reactivation of a neural network, bringing remembered information into the working memory for use.
Retroactive interference	A type of retrieval failure that occurs when more recently learned information interferes with information that was already known.
Reworking	A memory aid that requires the learner to use new information in another way leading to semantic processing.
Schema	A mental framework for ideas in the human mind made of inter-related categories.
Schemas	A cognitive framework that helps us to organise and interpret information.
Seasonal Affective Disorder	A type of depression related to the change in seasons.
Secondary emotion	An emotion experienced in response to a primary emotion that requires cultural or social context.
Secure attachment	Is the ideal connection between a child and their priimary care giver/s. It implies that the child is well adjusted to tne world around them.
Selective attention	A person's tendency to choose which stimuli to pay attention to and which to ignore at any given moment.
Selective Serotonin Reuptake Inhibitors	A type of antidepressant drug that increases the levels of serotonin in the brain available for neural transmission.
Self-concept	The image we have about ourselves as individuals.
Self-esteem	Refers to an individuals feelings (both positive and negative) relating to their self concept.
Semantic memory	A type of memory used to remember general facts and ideas.
Semantic processing	This occurs when the meaning assigned to new information is the focus.
Sensation	Any conscious experience resulting from the stimulation of a sense organ.
Sensorimotor stage	Piaget stage of development between Birth - 2 years when infants develop their understanding of the sensory experiences and how to coordinate it with their motor abilities (movement).
Sensory cortex	The part of the brain that processes and interprets sensory stimulus.
Sensory neurons	Nerve cells activated by receiving information from the internal and external environment.
Sensory register	The first stage of the modal model of memory wherein attention is paid to specific incoming sensory information.
Serotonin	A hormone that acts a mood stabiliser that controls wellbeing and happiness.
Short-term memory store	The second stage of the modal model of memory where information is encoded using previously remembered information or rapidly lost.

Similarity factors	The tendency to process similar stimuli to what is already known more quickly than unfamiliar stimuli.
Social behaviour	Behaviour that are exhibited by communal social species when interacting with each other.
Social media	Websites and applications that allow users to create and share content and participate in social networking.
Somatosensory cortex	A region of the brain responsible for receiving and processing sensory information.
Stagnation	Refers to individuals who fail to find ways to contribute to the world around them.
State-dependent cues	A type of retrieval cue where stimuli in our internal environment such as mood form a link to when a memory was formed.
Storing	The process of forming new neural networks between incoming information and previously learned information to form a memory.
Stuctural processing	This occurs when only the visual features of new information are focused on.
Subjective feelings	The personal experience of emotion.
Sulci	A groove between the gyri on the cerebral surface of the brain.
Suppression	When uncomfortable thoughts or feelings are pushed out of the mind.
Symbolic thinking	The use of symbols and other form of mental representations of objects or events in the world. For example the understanding of letters and numbers.
Synapse	The space between the end of one neuron and the beginning of another.
Thalamus	An egg shaped structure of the limbic system that processes and regulates emotion.
The developmental niche	The phsycial and social sitations in which children live. It includes that customs of childrearing in an individual's culture and the psychology of the caretakers.
The zone of proximal development	The difference between what a learner can do without help, and what they can do with guidance from a skilled partner. That is, when a task is just beyond an individual's capabilities.
Thermoreceptors	A receptor stimulated by heat or cold.
Transformation	A change from one thing or state to another.
Traumatic brain injuries (TBI)	An injury to the brain occuring as a result of a forceful bump, blow or other type of head contact.
Traumatic brain injury	A type of brain injury that occurs when a sudden trauma causes damage to the brain.
Tricyclic antidepressants	A class of depressants used in the treatment of Major Depressive Disorder.
Twin studies	Studies conducted on monozygotic or dizygotic twins to examine the influence of nature and nurture.
Two-factory theory of Emotion	Theorised by Schachter and Singer. Suggests emotion is based on two factors: physiology and cognition.
Unconscious	An organism's lack of awareness of internal and external factors.
Universal emotions	Emotions, and accompanying facial expressions, that are recognised around the world.
Virtual reality	A computer-generated environment with scenes and objects the user can interact with in cyberspace.
Virtual Reality Exposure Therapy	When virtual reality is used to allow patients to face fears and aid in the treatment of anxiety and phobias.
Visual cortex	The part of the cerebral cortex that processes nerve impulses from the eyes.
Visuo-spatial sketchpad	The system that processes visual information within the short-term memory or working memory.
Witness identification	This occurs when a witness to an event or crime is asked to identify the perpetrator.
Working memory	An addition to the short-term memory that has separate systems for visual and auditory information.

SACE Stage 1 Psychology in Context



Essentials education

ADELAIDE TUITION CENTRE

SACE Stage 1 **Psychology in Context**

Innika Ackerley
Deb Green
Tam Hood
Lauren Scarfe

Essentials education
ADELAIDE TUITION CENTRE

PUBLISHING INFORMATION
This Workbook is part of the Essentials series, designed to support the teaching of SACE Stage 1 and 2 subjects in South Australia. It is specially designed to meet the requirements of SACE Stage 1 Psychology.

The Essentials Education series is published by
Adelaide Tuition Centre
PO Box 997, North Adelaide, S.A. 5006.
TELEPHONE (08) 8180 0695
www.essentialseducation.com.au

LIBRARY CATALOGUE:
Ackerley; Innika – Green; Deb – Hood; Tam – Scarfe; Lauren
1. Psychology - 2.Essentials Workbook
ISBN - 978-1-925505-54-2
First Edition 2024.
Copyright © Essentials Education 2024.

COPYRIGHT INFORMATION
The copyright of the text of this book remains the property of the authors and the copyright of the diagrams and cartoons belongs to the publisher. All rights are reserved except under the conditions described in the Copyright Act 1968 of Australia and subsequent amendments. No part of this publication may be reproduced, stored in a retrieval system, or transmitted in any form or by any means, without the prior permission of the publisher. While every care has been taken to trace and acknowledge copyright, the publishers' tender apologies for any accidental infringement where copyright has proved traceable.

TABLE OF CONTENTS

5 1. Indigenous Psychology

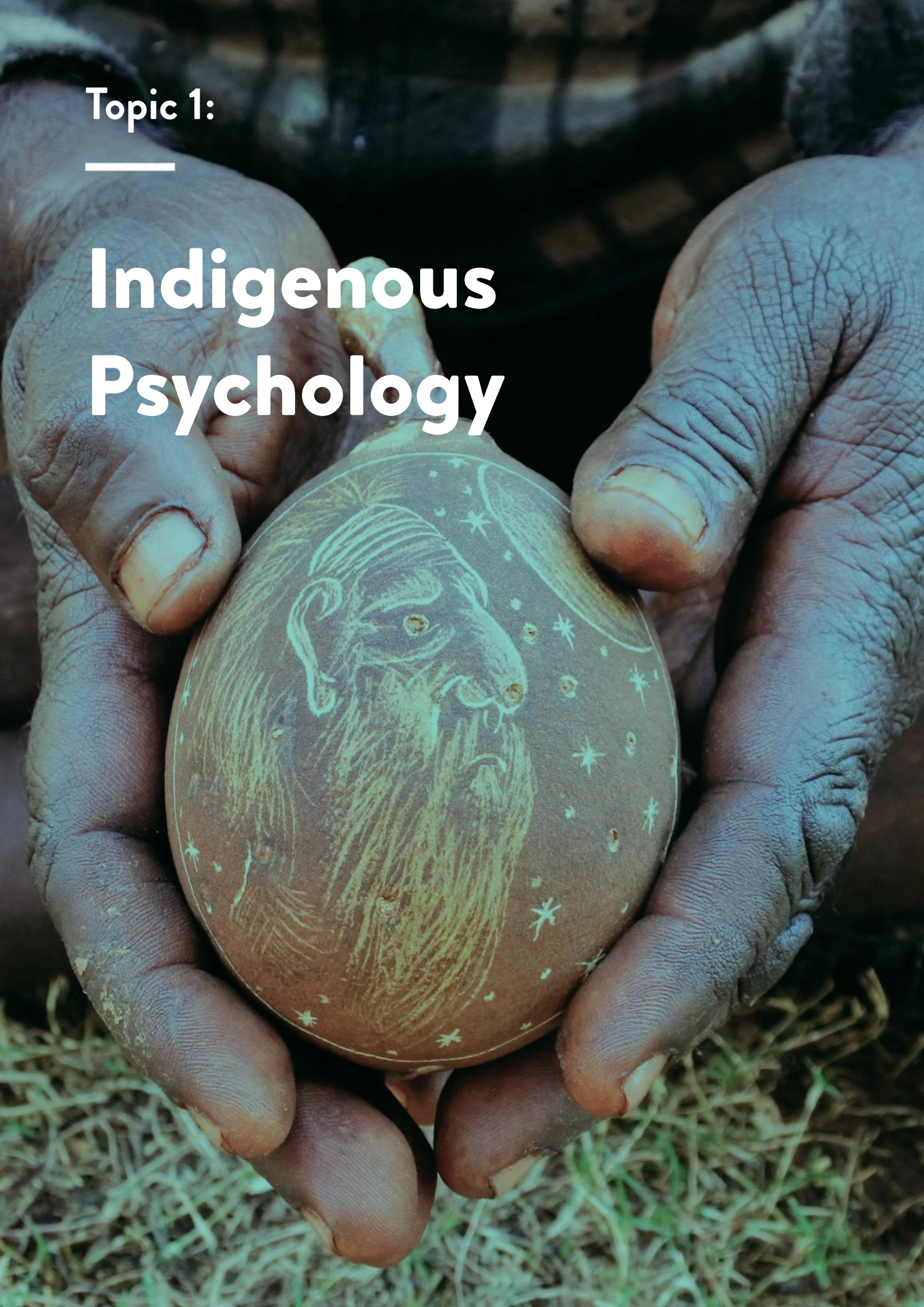
24 2. Organisational Psychology

56 3. Cyberpsychology

66 4. Environmental Psychology

73 5. Forensic Psychology

111 6. Exercise and Sports Psychology



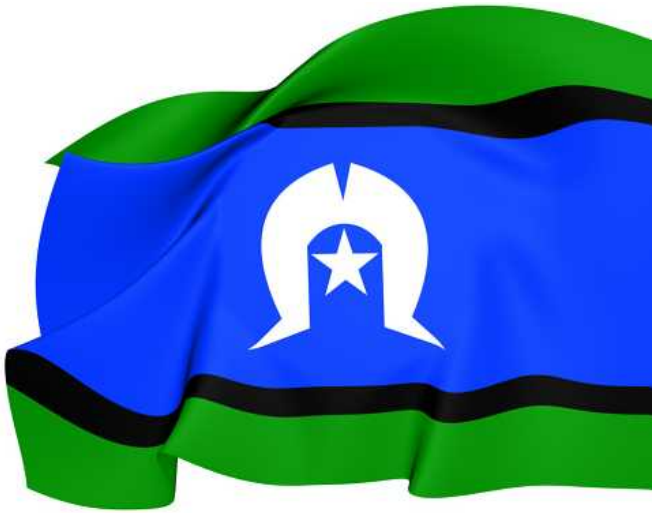
Topic 1:

Indigenous Psychology

We acknowledge and pay our respects to the Kaurna people, the traditional custodians whose ancestral lands upon which we write this book.

We acknowledge the deep feelings of attachment and relationship of the Kaurna people to country, and we respect and value their past, present and ongoing connection to the land and cultural beliefs. We acknowledge the elders past, present and emerging and value the contributions that First Nations people have contributed to the Education of people both formally and through sharing their knowledge through stories and culture.

Aboriginal and Torres Strait Islander peoples have experienced a long history of exclusion from Australian history books, the Australian flag, the Australian anthem and, for many years, Australian democracy. This history of dispossession and colonisation lies at the heart of the disparity between Aboriginal and Torres Strait Islander peoples and the wider Australian community today.



Including recognition of Aboriginal and Torres Strait Islander people in events, meetings and national symbols is one part of ending the exclusion that has been so damaging. Incorporating welcoming and acknowledgement protocols into official meetings and events recognises Aboriginal and Torres Strait Islander peoples as the First Australians and Traditional Custodians of land. It promotes an ongoing connection to the place of Aboriginal and Torres Strait Islander Australians and shows respect for Traditional Owners. Credit: Reconciliation Australia.

This curriculum outline and suggested lesson activities and resources are provided to you from a whitefella perspective of what may be important areas to cover in the Indigenous Psychology topic. This content by no means represents the wider voice of Australia's First Nations People, but aims to start closing the gap in knowledge, education, and increase cultural competence whilst bridging a relationship that is based on equality and recognition of the injustice that this

community has been forced to endure, alongside the health and wellbeing implications as a result.

We would like to thank Tess Ryan for her guidance and support of the materials put together for the Indigenous Psychology chapter. This document has been endorsed by Dr Tess Ryan, is a proud Biripi woman completing her PhD at the University of Canberra on the topic of Indigenous women and leadership in Australia. Tess works with the Melbourne Poche Centre for Indigenous Health at the University of Melbourne.

Tess Ryan PhD has worked substantially in government and community organisations supporting Aboriginal and Torres Strait Islander families. She is multidisciplinary in her approach, writing and discussing Aboriginal and Torres Strait Islander women, feminist power, media representation, leadership, research, cultural safety, public health and education. Tess has significant experience gathering data through interviews for a project with the Lowitja Institute on the Indigenous Health Researcher Workforce, where she was the project lead, and in gathering data for two projects regarding Indigenous education and the NAPLAN system. Tess currently works embedding Indigenous knowledge into the curriculum at the Australian Catholic University, and in building a research studies pipeline for Aboriginal and Torres Strait Islander students. She is the convenor of the university's Indigenous Ethics Advisory Panel and a member of its Human Research Ethics Committee and University Research Committee.

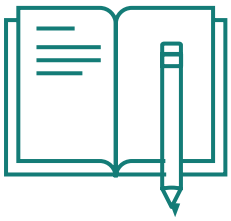
Ngadlurla tampinthi, ngadlu Kaurna yartangka inparrinthi. Ngadlurlu parnuku tuwila yartangka tampinthi.

Ngadlurlu Kaurna Minyurna yaitya yarta-mathanya Wama Tarntanyaku tampinthi.Parnuku yailtya, parnuku tapa purruna yalarra puru purruna.

PSYCHOLOGY EVENTS		ABORIGINAL RESPONSES
	1986	• Ottawa Charter for Health Promotion
• 24th International Congress of Psychology, Sydney • Review of psychology in Australia	1988	• Bicentenary 'Celebration of the Nation'
	1989	• A National Aboriginal Health Strategy
• 25th Annual APS Conference, Melbourne • 'The Psychology of Indigenous People Symposium	1990	
• 26th Annual APS Conference, 'Aboriginal Issues' • Aboriginal People and Psychology Interest Group formed	1991	• Royal Commission into Aboriginal Deaths in CustodyCouncil for Aboriginal Reconciliation Act
• Psychology Program Workshop, Cairns • APS Working Party was established • Mini-conference was held in Perth	1992	• Mabo Decision • Social Justice Commissioner appointed as part of HREOC • Paul Keating Redfern speech
	1993	• National HREOC Inquiry into Human Rights and Mental Illness • First Nations Aboriginal Mental Health Conference 'Our Way' • International Year of Indigenous Peoples
• Representations of psychology in Aboriginal Australia	1994	• International Decade for World's Indigenous Peoples
• Guidelines for the provision of psychological services	1995	• Way Forward Consultancy Report
• 30th Annual APS Conference, Perth	1996	• Rob Riley's keynote address at the APS Conference, Perth • First Nations Reconciliation Week
• Racism and Prejudice: Psychological Perspectives – APS • Position Paper	1997	• Bringing Them Home Report of the National Inquiry into the Separation of Aboriginal and Torres Strait Islander children from their families
• 32nd Annual APS Conference, Cairns • Mini-conference held in Perth	1998	• Aboriginal Reconciliation Convention
• Working with Indigenous Australians: • A Handbook for Psychologists (Dudgeon et al)	1999	• National Statement on Ethical Conduct in Research Involving Humans
• National Workshop on Psychology and Indigenous • Australians, UniSA	2000	• Decade of Reconciliation
	2002	• The NHMRC Road Map: A strategic framework for improving Aboriginal and Torres Strait Islander Health Research
	2003	• National Framework for Aboriginal and Torres Strait Islander Social and Emotional Wellbeing • National Coalition of Aboriginal and Torres Strait Islander Social Workers Association first National Conference
	2005	• Social Justice Report • WA Aboriginal Child Health Survey: Vol 2, SEWB
	2007	• UN Declaration on the Rights of Indigenous People
• 43rd Annual APS Conference • Formations of APIA	2008	• 'Close the Gap' campaign launched • Kevin Rudd's Apology to the Stolen Generations
• National Research Roundtable on Racism towards • Indigenous Australians	2009	• Billard Blank Page Summit • Boatshed Declaration against Racism initiated by AIPA, Perth • Living on the Edge, AIPA
• 27th International Congress of Applied Psychology	2010	• Working Together Book (First Edition)
• Development of a Reconciliation Action Plan (RAP) with AIPA	2011	
• ATSIPP celebrated its 21st anniversary	2012	• Formation of Aboriginal and Torres Strait Islander Mental Health and Advisory Group
	2013	• Formation of the Aboriginal and Torres Strait Islander Mental Health and Suicide Prevention Advisory Group

On Saturday, 14 October 2023, Australians had their say in a referendum about whether to change the Constitution to recognise the First Peoples of Australia by establishing a body called the Aboriginal and Torres Strait Islander Voice. The result was a resounding NO!

Overview of what Universities are covering



ADELAIDE UNIVERSITY

Key Topics Covered:

- Review historical components as it relates to the current health and wellbeing of Indigenous people.
- Understand the unique challenges faced by Indigenous populations in achieving equitable outcomes.
- Gain an improved level of cultural competency and reflexivity in working with Indigenous people.
- Understand how psychological research can inform practice with Indigenous people.

CHARLES STUART

Key Topics Covered:

- Pre-invasion Indigenous Australian cultures, including an introduction to The Dreaming as worldview and law, kinship and social organisation, economic and totemic relations to land, and the relationship between these factors and identity and self-concept in collectivist cultures.
- The historical, socio-economic and political processes of colonisation, including the physical and psychological impact of disease, violence and dispossession, segregation and protectionism, and forcible removal of children.
- Social justice and contemporary issues impacting upon or of concern to Indigenous Australians today, and the relationship between these factors and mental health and wellbeing.
- The contemporary psychological consequences of colonialism, including trans-generational trauma, loss and grief, suicide and self-harm, psychosis, depression and anxiety disorders.
- Indigenous grief and loss models and methodologies.
- Deconstruction of the discipline of psychology and its role as an agent of colonialism.
- Power and privilege, self- and professional reflexivity and implications for citizenship and professional practice.
- Strategies and protocols for working effectively in Indigenous contexts and implications for professional practice.
- Applying skills and knowledge to working effectively with people from diverse cultures in a multicultural society.

UNIVERSITY OF SYDNEY

Course Name: Indigenous Psychology

Course Description: This course explores the intersection of psychology and Indigenous cultures in Australia. It focuses on understanding Indigenous perspectives on mental health, well-being, and healing practices. Students learn about the social, cultural, and historical factors that shape the psychological experiences of Indigenous individuals and communities.

Key Topics Covered: Indigenous cultural practices, community-based approaches to mental health, historical trauma, cultural identity, culturally sensitive assessment and intervention, social and emotional wellbeing.

UNIVERSITY OF MELBOURNE

Course Name: Indigenous Psychologies and Mental Health

Course Description: This course explores the cultural, social, and historical factors that influence the mental health and well-being of Indigenous Australians. It examines Indigenous perspectives on psychology, incorporating traditional healing practices, cultural resilience, and the impacts of colonization. Students critically analyse the strengths and limitations of Western psychological frameworks when applied to Indigenous populations.

Key Topics Covered: Cultural psychology, colonization and mental health, trauma and healing, cultural resilience, Indigenous research methodologies, and social determinants of health.

Remember that when incorporating indigenous perspectives into classroom activities, it is crucial to involve and consult with the local indigenous community, respecting their cultural protocols and seeking their guidance and input throughout the process. This ensures the activities are authentic, respectful, and meaningful to all participants.

Curriculum Outline Option 1

WEEK	TOPIC CONTENT	RESOURCES
W1	**Introduction to Indigenous Psychology**	
	Historical context and colonization impacts Stolen Generations	https://www.evolves.com.au/impact-colonisation-indigenous-australians/ https://australianstogether.org.au/discover-and-learn/our-history/stolen-generations
	Impacts of colonization on Indigenous communities	As above and
	Cultural practices, traditions, and belief systems	https://shareourpride.org.au/sections/our-culture/index.html
	Ethical considerations in Indigenous research • Informed consent, cultural sensitivity, and confidentiality • Research protocols and guidelines for engaging with Indigenous communities	Intro video discussing Closing the Gap and engaging in good research. https://www.youtube.com/watch?v=-PqSEm15lSs&t=219s
W2	**Traditional Healing and Well-being**	https://www.aihw.gov.au/reports/indigenous-australians/spatialvariation-to-access-primary-health-care/contents/table-of-contents.
	Traditional healing modalities (e.g., bush medicine, ceremony) and spirituality	https://healthinfonet.ecu.edu.au/learn/cultural-ways/traditional-healing-and-medicine/
	Connection to ancestral knowledge and spirituality	https://deadlystory.com/page/culture/Life_Lore/Spirituality
	Role of healers and traditional medicine practitioners	
	Holistic approaches to well-being (physical, mental, emotional, spiritual)	https://www.wellbeing.com.au/wild/bush-medicine-aboriginal-healing
	Strength-based perspectives and community support networks	
	Indigenous concepts of well-being	Art, music, craft, stories and connections
	Indigenous perspectives on resilience and balance	
W3	**Trauma, Resilience, and Mental Health**	https://healthinfonet.ecu.edu.au/learn/health-topics/social-and-emotional-wellbeing/
	Intergenerational trauma and its effects	
	Historical trauma and its impact on Indigenous communities	
	Trauma-informed approaches in working with Indigenous individuals	
	Resilience and protective factors in Indigenous communities	
W4	**Indigenous Youth and Education**	
	Educational challenges and opportunities	
	Educational disparities and barriers for Indigenous youth	
	Cultural biases in mainstream education systems	
	Empowering Indigenous youth through education	https://www.education.gov.au/closing-the-gap
	Culturally inclusive pedagogy and curriculum development • Incorporating Indigenous perspectives in teaching materials	

Curriculum Outline Option 2

WEEK	TOPIC CONTENT	RESOURCES
W1	**Introduction to Indigenous Psychology**	Resources
	Pre-colonial Indigenous societies and practices	https://www.evolves.com.au/impact-colonisation-indigenous-australians/
	Intergenerational trauma and historical injustices	
	Indigenous cultures and diversity in Australia	
	Overview of diverse Indigenous cultures and languages	https://deadlystory.com/page/culture/Life_Lore/Language
	Regional and cultural variations across Australia	
W2	**Traditional Healing and Well-being**	https://healthinfonet.ecu.edu.au/key-resources/health-professionals/health-workers/
	Cultural identity and self-determination	
	Identity formation and cultural continuity	
	Impact of cultural disconnection and strategies for revitalization	
	Importance of self-determination and self-governance in Indigenous communities	
W3	**Culturally appropriate mental health services**	https://www.health.gov.au/resources/publications/primary-health-networks-phn-primary-mental-health-care-guidance-aboriginal-and-torres-strait-islander-mental-health-services?language=en
	Mental health disparities and access to care	
	Disparities in mental health outcomes and service provision	
	Barriers to accessing culturally appropriate mental health care	
	Cultural considerations in assessment, diagnosis, and treatment planning	
	Culturally responsive and community-led mental health services	https://www.tandfonline.com/doi/full/10.1111/ap.12287 Briggs empowers young mob through his music
W4	**Identity formation and self-esteem in indigenous communities**	
	Identity formation and self-esteem	
	Impact of cultural identity on Indigenous youth well-being	
	Navigating multiple identities and cultural pride	
	Fostering positive self-esteem and identity development	

Option 3: Design your own.

Additional topics for consideration

Culturally responsive therapeutic approaches	Supporting Indigenous youth mental health
Indigenous healing frameworks and models of care	Mental health challenges specific to Indigenous youth
Integrating traditional healing practices with Western psychology	Promoting resilience, self-care, and coping strategies
Transgenerational transmission and healing processes	Community-based programs and support services
Collaborative community partnerships	Incorporating community
Engaging with Indigenous communities in a respectful and meaningful way	Promoting engagement with elders and the community and self-advocacy
Building partnerships based on trust and reciprocity.	Influence of art and music in healing.

Potential lesson activities

EDUCATIONAL OPPORTUNITIES

Group presentations: Divide participants into small groups and assign each group a specific educational challenge faced by Indigenous youth (e.g., access to quality education, cultural bias in curriculum). Have them discuss the challenges, their root causes, and potential strategies for addressing them. Each group can then present their findings to the larger group.

Guest Speaker: Invite a guest speaker from an Indigenous education organization or community to share their experiences and insights on the educational challenges and opportunities for Indigenous youth. Participants can engage in a Q&A session to deepen their understanding.

Cultural Exchange Day: Organize a cultural exchange event where students from different cultural backgrounds, including indigenous students, share their traditions, languages, music, and food with each other. This activity promotes inclusivity, appreciation for diversity, and mutual understanding within the school community.

Indigenous Art and Storytelling Workshops: Invite local indigenous artists and storytellers to conduct workshops with the students. The workshops can focus on traditional art forms, storytelling techniques, or creative writing inspired by indigenous perspectives. This activity fosters creativity and appreciation for indigenous art and cultural expression.

SUPPORTING INDIGENOUS YOUTH MENTAL HEALTH

Case Study Analysis: Provide case studies depicting common mental health challenges faced by Indigenous youth (e.g., intergenerational trauma, acculturation stress). In small groups, participants analyse the cases, identify cultural factors impacting mental health, and propose appropriate strategies for supporting and promoting mental well-being.

Community Resource Mapping: Ask participants to research and identify local community-based mental health resources and support services specifically tailored for Indigenous youth. They can create a visual resource map highlighting available services, their locations, and contact information. This activity promotes awareness of existing resources and encourages collaboration with community organizations.

Briggs empowers young mob through his music.

Clothing the Gap empowers through clothing.

Deadly Science assists young mob in Science education. All this works to build strength in the young ones mental health, and representation is vital for them to see how to deal with everyday life in the Colony.

INDIGENOUS HEALING PRACTICES AND SPIRITUALITY

Guest Speaker or Panel Discussion: Invite a traditional healer or an Indigenous community member with knowledge of healing practices to speak to the students. They can share insights, stories, and demonstrations of traditional healing practices and the role of spirituality in well-being. Alternatively, organize a panel discussion with multiple healers from different Indigenous cultures to provide diverse perspectives.

Experiential Activity: Engage students in a hands-on activity related to traditional healing practices, such as making herbal remedies or creating traditional healing tools. This activity allows students to explore the practical aspects of Indigenous healing and gain a deeper appreciation for the cultural significance of these practices.

Connection to Land and Nature: Land Acknowledgment and Reflection: Begin the session with a land acknowledgment, acknowledging the traditional custodians of the land. Facilitate a reflective discussion on the importance of the land and its connection to well-being. Encourage students to share personal experiences or stories related to their own connection with nature and the environment.

Nature Walk or Virtual Tour: Organize a nature walk or virtual tour of a significant Indigenous site or natural area. Along the way, highlight the cultural significance of the land and its importance for Indigenous well-being. Engage students in discussions about their observations and feelings during the experience.

Weaving: Weaving practices are intrinsically linked to the land as they are made from local materials and plants. These include pandanus, palms and selected bark fibres. These plants are woven and knotted into baskets, bags and mats, clothing and fishing nets. Weaving is a part of Indigenous culture used in ceremonies and holds great significance within the community. Now, many Indigenous artists use this art form to create that sense of awe within their artworks and to represent their connection to spirituality and ceremony.

CULTURAL IDENTITY AND SELF-DETERMINATION

Storytelling Circle: Create a safe and respectful space for students to share personal stories about their cultural identities, heritage, and experiences of self-determination. Encourage active listening and respectful dialogue among participants to foster a sense of community and understanding.

Cultural Expression Activity: Facilitate a hands-on activity that allows students to explore and express their cultural identities creatively. This could include art, music, dance, or traditional craft-making. Students can showcase their creations and share the meaning behind their artistic expressions.

INDIGENOUS CONCEPTS OF WELLBEING

Mindfulness and Connection to Self: Introduce students to Indigenous mindfulness practices that promote well-being and connection to self. Guide them through meditation exercises, breathing techniques, or grounding practices inspired by Indigenous traditions. Allow time for reflection and group discussion on the effects of these practices.

Wellbeing Circle: Form small discussion groups and assign each group a specific aspect of Indigenous well-being (e.g., physical, mental, emotional, spiritual). In their groups, students can brainstorm and share strategies for enhancing well-being in that particular aspect. Groups can then present their ideas to the larger group for a comprehensive discussion.

Science as a Human Endeavour

COMMUNICATION AND COLLABORATION

- Science is a global enterprise that relies on clear communication, international conventions, and review and verification of results.
- Collaboration between psychologists and stakeholders advances research and understanding. It requires shared evidence from many sources in a multidisciplinary approach.

DEVELOPMENT AND APPLICATION

- Developments in research and technology lead to advances in psychological understanding.
- The application of psychological understanding can enable scientists to develop solutions, design actions, and evaluate and respond to economic, sociocultural, and environmental factors.

INFLUENCE

- Psychological knowledge and its application are both influenced by, and influence economic, sociocultural, religious, ideological, political, and environmental perspectives in a local, national, and global context.
- The use of psychological knowledge may have positive, negative, or unexpected consequences that require monitoring, assessment, and evaluation. The use of psychological knowledge must take into account risks and ethical considerations.

Possible resources

Climate and health monitoring and evaluation data While there is much investment and support for Aboriginal and Torres Strait Islander environmental management programs, health and wellbeing co-benefits have not figured prominently in impact evaluations (Barber & Jackson 2017). The 'Healthy Country, Healthy People' program of work in the Northern Territory has been a notable exception, although measures were biomedical and based on psychological distress scales developed in other populations (Burgess, Johnston, Berry et al. 2009). Over time, researchers have worked with communities to develop wellbeing indicators that are based on values and priorities of Aboriginal and Torres Strait Islander people, such as connection to culture and family — for example, the Interplay Wellbeing Framework (Cairney, Abbott, Quinn et al. 2017), the Indigenous wellbeing concept (Larson, Stoeckl, Jarvis et al. 2020) and the Mayi Kuwayu national survey project (Wright, Yap, Jones et al. 2021). The AbCF too, instils the need for monitoring and evaluation processes to be driven by community perspectives on what they view as important (Donatuto, Campbell & Trousdale 2020; McMurray, Foley, O'Sullivan et al. 2019). These types of indicators developed by Aboriginal and Torres Strait Islander people and directed at measuring the intersection of environment and health, should be adopted consistently within climate and health projects for ongoing monitoring and evaluation and for building the evidence base to inform policy and practice. In the long-term, a nationally consistent set of indicators could be used to track the link between Aboriginal and Torres Strait Islander health and climate change across key wellbeing domains as recommended by the United Nations as part of the Paris Agreement reporting requirements (Middleton, Cunsolo, JonesBitton et al. 2020).

SIS and SHE tasks and assessments could be built around the following areas:

Aboriginal health and wellbeing. Putting community driven strengths-based approaches into practice. **https://www.lowitja.org.au/content/Image/Aboriginal_Health_and_Wellbeing_services_DD3_FINALwith_links.pdf**

Read this article on the importance of Indigenous rights to native foods: **https://www.theguardian.com/australia-news/2018/jul/11/australia-on-a-plate-recognising-indigenous-rights-to-bush-food**

Impact of climate change on the health of Aboriginal and Torres Strait Islander people: **https://www.lowitja.org.au/page/services/resources/Cultural-and-social-determinants/climate-health/climate-change-and-aboriginal-and-torres-strait-islander-health**

Impact of climate change on the health of Aboriginal and Torres Strait Islander people: **https://www.lowitja.org.au/page/services/resources/Cultural-and-social-determinants/climate-health/climate-change-and-aboriginal-and-torres-strait-islander-health**

LAND RIGHTS AND HEALTH

In 2006, an Amendment Bill to the *Aboriginal Land Rights (NT)* Act, 1976 passed with little community consultation. It provided Traditional Owners option to grant 99-year leases over their land and townships to promote private investment. While entry into the lease system is voluntary, communities have been coerced into providing leases in exchange for government funding for basic rights such as housing and education and there are similar implication for provision of health services (Creamer & Hall 2019; Grealy 2021; Watson 2007).

The *NSW Aboriginal Land Rights Act*, 1983 led to the establishment of Local Aboriginal Land Councils (LALCs) providing them control of Aboriginal reserve and mission land as an act of reconciliation and compensation for historic dispossession. However, the LALCs were not provided the resources nor technical knowledge and skills required of local councils to develop and maintain housing, roads, water and sewerage systems – key health and safety infrastructure. Twenty-five years of significant underfunding has led to widespread housing disrepair, community infrastructure failures and associated health risks (Henderson, Byleveld, Standen et al, 2016). Over the last decade, policy initiatives are attempting to catch-up the backlog (e.g., Aboriginal Communities Water and Sewerage Program, Roads to Home Program, Housing for Health). Health impacts from substandard housing, water, sewerage, power and telecommunications infrastructure will be compounded by global warming (NACCHO 2021; Race, Mathew, Campbell et al. 2016b).

In the national *Housing for Health* program, surveys of public housing in 190 Aboriginal communities over 1999-2012 revealed that only 10 per cent of homes were electrically safe, 35 per cent had a functioning shower and 6 per cent had a kitchen in which food could be stored, prepared and cooked. Most faults were due to poor maintenance or poor initial construction/installation. The program was able to make substantial improvements over this time, however the main limitation was funding (Pholeros, Lea, Rianow et al. 2013). In NSW, improvements made under *Housing for Health* led to significantly reduced rates of hospitalisations for infectious diseases (Phibbs & Thompson 2011).

SIS and SHE tasks and assessment could be built around the following areas:

DIMENSIONS	TRADITIONAL	HISTORICAL	CONTEMPORARY	GAPS IN KNOWLEDGE	SOLUTIONS
Physical	• Earth as 'Mother', nature as family • Connection to country, source of renewal • Traditional medicine • Traditional diet and activity,'healthy specimens'	• Physical genocide • Dispossession, 'uprooted' • Environmental degradation • Rapid change in diet • Incarceration • Institutionalisation • Forced labour • Ill health, exposure to disease	• Population changes • Present morbidity, burden of chronic illness • Burden of care on children • Land-rights and treaty • Holistic view • Urban, rural and remote differences • Exclusion from health	• Stress, immunity and chronic disease • Greif and mortality • Transgenerational trauma physical health • Chronic illness and mental health • Complementary healing practices	• Sovereignty and Native Title • Equity and access • Accountability • Traditional diet, medicines and healers • Connections to country • Holistic medicine • Best start to life • Basic requirements
Psychological	• Different concepts, beliefs and meaning • Sense of self; external attributions; site of distress, shared learning, cognitive development and role • Autonomy and relatedness • Life continuum, belonging • Birth and bereavement	• Psychological genocide, profound trauma • Abuse • Loss and grief • Extreme powerlessness • Misdiagnosis • Mislabelling • Re-traumatisation	• Place in society • Present trauma, loss, grief • Future uncertainty • Psychological morbidity, illness • Identity issues • Psychological strengths • Apology • International perspective • Exclusion from humanity	• Appropriate diagnostic systems • Treatment options • Culturally valid tools • Appropriate outcomes • Accountability measures • Impact of racism and discrimination • Cultural and spiritual phenomenology • Cultural bound syndromes	• Truth in history • National 'Sorry Day' • Human rights, safe development, future assurance • Inclusiveness • Pride, positive images • Professional development • Indigenous therapies, grief and trauma • Addressing 'stress' • Identifying and tackling racism
Social	• Community centred kinship system • Attachment and child-rearing • Early autonomy • Country as home, kin • Collective vs individual obligation and reciprocity • Two-way sharing	• Social genocide • Stolen generations • Racism and apartheid • Slave labour	• Changing role of family especially men • Role models • Family disruption, isolation • Loss of buffering • Removal of children, adults • Paternity • Present disadvantage, impoverishment • Reconciliation • Exclusion from society	• Family therapists • Children's needs vs Family • Community outcomes • Systemic barriers	• Social justice • Social determinants • Generational view, long-term commitment • Whole of life concept • Tracing family, restoring kinship, recording oral histories • Narrative therapies • Empowerment • Representative body
Spiritual	• Origins of life • Dreaming • Belonging, connectivity • Philosophical views • Beliefs, experiences, healing	• Spiritual genocide • Impact of mission life • Imposition of Christianity	• Value of wisdom • Intolerance • Understanding difference • Exclusion from existence	• Spirituality and health • Existential despair	• Central to health of Australia • Healing • Understanding, tolerance, respect • Purpose and future hope
Cultural	• Lore/Law • Language • Ceremony • Healing beliefs, expression, experiences	• Cultural genocide • Misinterpretation • Tokenism • Sacrilege	• Cultural clash, two worlds • Cultural mix • Cultural practices, age, gender endurance and resilience, strengths • Cultural knowledge • Cultural grief • Exclusion from custom and consciousness	• Continuum of cultural identity • Diversity of practice and experience • Models of care	• Acceptance National identity • Compensation • Cultural renaissance, self-determination (Indigenous rights) • Indigenous governance • Cultural security • Cultural respect framework • Education, training • Shared learning, collaboration

Student learning activities

SYNTHESIS TASK

Read through examples found in the Australian Human Rights Commission's Social determinants and the health of Indigenous peoples in Australia – a human rights-based approach:

Such as: 3(c) Evidence of the health impact of Indigenous community control of health services; 3(d) Traditional ownership of land and health status; the case study on the Kuka Kanyini project, in the Anangu Pitjantjatjara Lands from Calma's speech. **https://humanrights.gov.au/about/news/speeches/social-determinants-and-health-indigenous-peoples-australia-human-rights-based**

Use information and quotes from the speech to explain the importance of self-determination to Indigenous communities' wellbeing.

RESEARCH TASKS/DECONSTRUCT & DESIGN:

Indigenous Perspectives on Mental Health:
Explore Indigenous perspectives on mental health and well-being, including traditional beliefs and attitudes toward mental illness. Discuss how these perspectives differ from mainstream Western approaches and how they influence help-seeking behaviours and mental health outcomes.

Cultural Identity and Wellbeing:
Explore the relationship between cultural identity and psychological well-being among Indigenous youth. Discuss how a strong sense of cultural identity impacts their mental health, resilience, and overall well-being compared to those who have a weaker connection to their cultural heritage.

Colonisation and Mental Health Disparities:
Investigate the ongoing impact of colonisation on the mental health of Indigenous communities. Discuss how historical and contemporary factors, such as cultural suppression, land dispossession, and social marginalization, contribute to mental health disparities and the development of culturally appropriate interventions.

ACTIVITY: INDIGENOUS RESEARCH ETHICS SIMULATION

The goal of this activity is to promote critical thinking about research ethics, particularly when working with Indigenous communities.

Split into groups of 3-4 students, using the scenarios provided, discuss and make decisions based on ethical principles to ensure cultural respect and community collaboration.

Scenario 1: Informed Consent:
You are conducting a research study on traditional healing practices in an Indigenous community. Some community members are reluctant to participate due to concerns about sharing sacred knowledge outside their community. How will you address informed consent while respecting cultural protocols and maintaining confidentiality?

Scenario 2: Cultural Protocols and Elders' Involvement:
You are studying the effects of colonization on mental health in an Indigenous community. The community requests that elders be actively involved in the research process and decision-making. How will you incorporate elders' perspectives and cultural protocols while ensuring the research is academically rigorous and respectful?

Scenario 3: Community Engagement and Ownership:
You are conducting a community-based mental health intervention in an Indigenous community. During the research process, the community expresses concerns about the intervention's potential impact on their cultural practices. How will you ensure ongoing community engagement and shared ownership of the research to address their concerns?

Scenario 4: Data Sharing and Community Benefits:
You have completed a research study in an Indigenous community that has generated valuable data. Another researcher from a different institution expresses interest in accessing the data for their research. How will you balance the benefits of data sharing with the need to protect the community's rights and interests?

Scenario 5: Researcher-Community Relationship:
As the research progresses, you realize that your assumptions about the community have led to misunderstandings and potential harm. How will your team address these challenges, build trust, and establish a positive researcher-community relationship moving forward

Additional resources:

The video in this source would be a good way to introduce students to the importance of land health to the health of communities and individuals: **https://australianstogether.org.au/discover/indigenous-culture/theimportance-of-land/**

The original version of the ground-breaking Indigenous rights documentary Our Generation. Winner "Best Campaign Film" at London International Documentary Festival 2011. For more information, visit: www.ourgeneration.org.au
Full features film: Our Generation: **https://www.youtube.com/watch?v=Tcq4oGL0wII**

The remarkable story of Indigenous AFL legend Adam Goodes. Through the backdrop of Goodes' journey, the feature documentary explores race, identity and belonging in Australia today. **https://iview.abc.net.au/show/australian-dream**

Intro video discussing Closing the Gap and engaging in good research.
https://www.youtube.com/watch?v=-PqSEm15ISs&t=219s

Range of short videos
https://www.abc.net.au/education#!/media/3415402/history-and-truths

Topic 2:

Organisational Psychology SAT

	TOPIC CONTENT	RESOURCES
W1	**The History of Work (1920 – now)**	
	MAJOR CHANGES OVER THE PAST CENTURY: 1920: Automobile Industry 1930: The Great Depression 1940: World War 2 1950: Women in the workplace 1960: Automation of the workplace 1970: Labor strikes, high unemployment, workplace disputes 1980: Deindustrialisation 1990: Job growth and low unemployment, dot.com industries 2000: Technology in the workplace 2010: Recovery from the 2008 recession, diversity increase 2020: The Covid era – working from home	The history of work: https://www.atlassian.com/history-of-work How work has changed in a century: https://medium.com/@karlaglatt/how-work-has-changed-in-a-century-4e1ab622473a Evolution of the workplace: https://www.avocor.com/blog/evolution-of-workplace/ The changing nature of the Australian workplace: https://www.rba.gov.au/speeches/2016/sp-so-2016-09-21.html ABS historical data: https://www.abs.gov.au/articles/historical-charts-1966 The complete history of working from home: https://www.flexjobs.com/blog/post/complete-history-of-working-from-home/ Working hour graphs: https://ourworldindata.org/working-hours How the world of work is changing: https://www.youtube.com/watch?v=HYPxrzHJhF8
	WOMEN IN THE WORKPLACE During the Industrial Revolution in the 18th and 19th centuries, women started to enter factories and mills to work in manufacturing roles, particularly in textile industries. In the early 20th century, various social and political movements, including the suffrage movement and the fight for women's rights, began to challenge traditional gender roles. During World War I and World War II, with many men serving in the military, women filled essential roles in the workforce to support the war effort. **REDUCTION IN BIAS AND CHANGES IN ADVERTISING** Employers have become more aware of the importance of creating inclusive workplaces and promoting diversity, which has influenced how they approach advertising job openings. Advertising has changed in relation to job descriptions, equal opportunity, and inclusive imagery. Employers are more likely to use unbiased selection criteria such as blind hiring and data-driven recruiting. **TECHNOLOGY AND AI** • The Industrial Revolution • Telecommunication and Telephony • Office machines (photocopiers, calculators etc) • Computers and data processing • The Internet and the digital revolution • Automation, robots and the use of AI. **COVID AND WORKING FROM HOME** The COVID-19 pandemic, which began in early 2020, dramatically accelerated the popularity of remote work. Lockdowns and social distancing measures forced many companies to shift to remote work arrangements to ensure business continuity and employee safety. This experience highlighted the viability and benefits of remote work for numerous industries. As a result of the pandemic, many companies started considering hybrid work models, where employees split their time between working from home and the office. This approach allows for a more flexible and balanced work environment.	Insights into diversity and inclusion: https://www.mckinsey.com/featured-insights/diversity-and-inclusion/women-in-the-workplace Why culturally diverse women are being held back in the workplace: https://www.youtube.com/watch?v=G3pAISQflyo Australia's workplace gender statistics: https://www.youtube.com/watch?v=Gq8xgVtsh4U Why women are paid less: https://www.youtube.com/watch?v=hP8dLUxBfsU Men's work vs. Women's work Task Possible D&D data source: https://www.wgea.gov.au/sites/default/files/documents/BCEC%20WGEA%20Gender%20Equity%20Insights%202020%20Delivering%20the%20Business%20Outcomes_WEB_FINAL.pdf Removing bias in advertising: https://www.seek.com.au/employer/hiring-advice/how-to-remove-bias-from-job-ads Examples of bias in recruitment: https://blog.ongig.com/diversity-and-inclusion/unconscious-bias-in-job-descriptions/ Gender decoder: https://gender-decoder.katmatfield.com/ Unconscious bias activities: https://www.teachingexpertise.com/classroom-ideas/activity-to-demonstrate-unconscious-bias-in-students/ Bias in recruitment: https://www.youtube.com/watch?v=6_K2j2fWiEc Stereotypical hiring practices: https://www.youtube.com/watch?v=QCFb4BiDDcE Possible D&D data source: https://www.developdiverse.com/chatgpt/ (Don't use Chat GPT to write your job advertisements) AI and automation in the workplace: https://www.mckinsey.com/featured-insights/future-of-work/ai-automation-and-the-future-of-work-ten-things-to-solve-for How AI will transform the work day: https://www.bbc.com/worklife/article/20230515-workplace-ai-how-artificial-intelligence-will-transform-the-workday How AI is negatively impacting workers: https://www.unimelb.edu.au/newsroom/news/2023/march/australian-workers-exhausted,-unprepared-for-technology-driven-future-of-work,-report-says Possible D&D data source: https://www.pewresearch.org/internet/2014/12/30/technologys-impact-on-workers/

W2	Managing Performance and Wellbeing	
	ASSESSMENT AND APPRAISAL within organisations allows employers to understand performance in the workplace – including whether targets are being met, as well as those factors that may be limiting performance. **UNDERSTANDING PERFORMANCE** is essential if an organisation wants to be able to analyse successes and failures and make changes if necessary. • Internal vs. External Factors • Attribution Theories **APPRAISALS** • Self-Appraisal • Downward Appraisal • Upward Appraisal • 360-degree Appraisal • Qualitative vs. Quantitative data in appraisals **EMPLOYEE WELLBEING** A company can only thrive when its employees have a sound level of wellbeing. Wellbeing encompasses both physical and mental health. A 2019 study found that 44% of companies now have a Health and Wellbeing strategy for employees, and this statistic is rapidly improving. **WORKPLACE STRATEGIES FOR WELLBEING MAY INCLUDE:** • Mental health support • Flexible work arrangements • Physical health initiatives • Work-Life balance • Training and Development • Employee feedback and involvement Organisations need to be able to measure employee wellbeing to determine if their strategies are successful. • Survey employees • Review absenteeism / illness • Review staff turnover • Quality and/or Quantity of Output	Workplace Wellness Programs: https://www.youtube.com/watch?v=s-QbV_OstxQ&t=7s What is a Wellbeing Survey? https://www.youtube.com/watch?v=nTcpBv15jq0&t=4s Workplace Wellbeing: https://www.blackdoginstitute.org.au/wp-content/uploads/2022/06/Workplace-wellbeing-fact-sheet.pdf The Modern Workplace: https://www.blackdoginstitute.org.au/wp-content/uploads/2021/10/modern_work.pdf Wellbeing in the Workplace: https://www.wellbeingaustralia.com.au/workplace/ Why is workplace wellbeing so important? https://www.youtube.com/watch?v=dCVIdbYfuHE The Workplace Wellbeing Assessment: https://www.workplacewellbeing.nsw.gov.au/welcome The secret to building a healthy and happy workplace: https://www.youtube.com/watch?v=Da5PNfG9Ezk Possible D&D Data Source: https://www.ahri.com.au/wp-content/uploads/MMcQ_WellbeingLab_Australia_WorkplaceSurvey_2019-2022-1.pdf Health and Wellbeing of the Australian workplace: https://www.robertwaltersgroup.com/content/dam/robert-walters/corporate/news-and-pr/files/whitepapers/health-and-wellbeing-whitepaper-aus.pdf TED Talk: Work-life balance: https://www.youtube.com/watch?v=4c_xYLwOx-g TED Talk Challenging an unhealthy work environment: https://www.youtube.com/watch?v=eYLb7WUtYt8 The NIOSH Worker Wellbeing questionnaire: https://www.cdc.gov/niosh/docs/2021-110/pdf/2021-110revised052021.pdf?id=10.26616/NIOSHPUB2021110revised52021 Example of a formal wellbeing report: https://www.olg.nsw.gov.au/wp-content/uploads/2022/05/Exhibit-OO-Workplace-Wellbeing-Survey-FInal-Report-11-June19-002.pdf Beyond Blue Personal Wellbeing Plan Possible SAT: Design a workplace wellbeing plan

W3	The right candidate for the right job	
	A JOB THAT FITS Finding the right job or career is important as it can significantly impact well-being, job satisfaction, and overall career success. • Determining your personal skills and interests is a crucial first step. • Some jobs are highly sought after. This means that there are many applicants, and the competition is strong. **FACTORS TO CONSIDER WHEN CHOOSING A CAREER:** • Working hours • Benefits • Company Culture • Company Stability • Opportunities for growth and education **JOHN HOLLAND'S THEORY** • American Psychologist John Holland introduced the 'Holland Occupational Themes' theory in the 1970s. • It is a theory of personality that looks specifically at careers and vocational choice. • Holland proposed that there are six unique personality types, which are determined by our interests and how we approach life situations. **INDICATORS THAT SOMEONE IS IN THE 'WRONG' JOB:** • Unable to use their strengths • They feel negative about their work • They are easily overwhelmed • They have lost their passion • The job does not align to their values • They cannot 'be themselves' in the workplace	How to find and do work you love: https://www.youtube.com/watch?v=jpe-LKn-4gM The psychology of career decisions: https://www.youtube.com/watch?v=4e6KSaCxcHs Career advice for teenagers: https://www.youtube.com/watch?v=aKNUkN3yWTw How to choose the right career path: https://www.nottinghamshire.gov.uk/media/122775/careerplanningguide.pdf Which career suits me? Quiz: https://explorecareers.com.au/career-quiz/ What job should I do? Quiz: https://www.training.com.au/ed/career-quiz/ Personal Skills Quiz: https://alis.alberta.ca/careerinsite/know-yourself/skills-quiz/ Holland Career Codes Test: https://www.truity.com/test/holland-code-career-test Holland's Theory: https://www.careers.govt.nz/resources/career-practice/career-theory-models/hollands-theory/ What to consider when choosing a career: https://www.skillstg.co.uk/blog/what-to-consider-when-choosing-a-career-the-important-factors/ Signs you are in the wrong job: https://www.linkedin.com/pulse/6-signs-youre-wrong-job-eric-sims Possible D&D Data Source: https://bcec.edu.au/assets/curtin-mwah-happy-workers-report-1.pdf The secret to success: https://www.youtube.com/watch?v=qOp4Y2_g5ZI&t=137s

	Many organisations are now considering **both soft skills** and **hard skills** in applicants. **SOFT SKILLS** are interpersonal or people skills, personal attributes and qualities that enable individuals to interact effectively and harmoniously with others in various personal and professional situations. These skills are often related to emotional intelligence, communication, and social interaction. **COMMON SOFT SKILLS INCLUDE:** Communication, Emotional Intelligence, Collaboration, Problem-Solving, Leadership, Conflict Resolution, Resilience and Creativity. **ESSENTIAL SKILLS** for a job, often referred to as core or fundamental skills, are the foundational abilities that employees need to perform their roles effectively in various industries and positions. These skills are essential because they provide the basis for learning and developing more specialized skills specific to a particular job or field. **DESIRABLE SKILLS** for a job are those additional competencies and qualities that go beyond the essential skills required for the role. While essential skills are foundational and necessary for performing the job's core functions, desirable skills can make a candidate stand out and excel in their position.	What are soft skills and why are they important? https://insight.study.csu.edu.au/soft-skills-what-are-they/ Quiz: Discover your soft skills: https://jobpersonality.co.uk/soft-skills-test Skills employers are looking for: https://www.careers.govt.nz/plan-your-career/get-ideas-for-your-career/skills-employers-are-looking-for/ Discover your skills QUIZ: https://nationalcareers.service.gov.uk/discover-your-skills-and-careers/ Skills Health Check: https://nationalcareers.service.gov.uk/skills-health-check/home Getting the right job and keeping it (Student Booklet): https://desbt.qld.gov.au/__data/assets/pdf_file/0026/7937/be-work-smart-booklet-print.pdf Transferrable Skills Worksheet: https://www.pdx.edu/careers/sites/g/files/znldhr1646/files/2020-10/Transferrable%20Skills%20worksheet.pdf Activity: Search job advertisements on Seek and perform a Content Analysis of essential and desirable skills. Can students identify the soft skills required in each advertisement? Possible SAT: Design a job advertisement for a specific role or industry, after researching necessary soft skills and qualifications, and then determining which skills are essential and which are desirable. Does your personality type suit your job? https://www.truity.com/test/big-five-personality-test-short2 The Myers Briggs for jobs: https://www.humanmetrics.com/personality Does your job suit your personality? https://www.youtube.com/watch?v=WEvqMN75sCI
	CANDIDATE SELECTION Job advertisements should include: • Experience (or will training be provided?) • Individual Characteristics and Circumstances • Qualifications and Education • Skills and Knowledge. **GOOD SELECTION METHODS** are affordable, fair, practical and valid. **INTERVIEWS** are one of the most popular selection methods. **STRUCTURED INTERVIEWS** are the most useful. The **HALO EFFECT** in job interviews is a cognitive bias that occurs when a positive impression in one area of a candidate's performance or personality influences the interviewer's overall perception of that candidate. The **HORN EFFECT** in job interviews is the opposite cognitive bias of the halo effect. It occurs when a negative impression in one area of a candidate's performance or personality influences the interviewer's overall perception of that candidate. Other selection methods include work samples, psychometric testing, and use of referees.	Employee Selection Methods: https://www.indeed.com/career-advice/career-development/employee-selection-methods Common Interview Questions: https://www.themuse.com/advice/interview-questions-and-answers How to conduct a structured interview: https://resources.workable.com/tutorial/conduct-structured-interview Advantages and Disadvantages to interview types: https://www.linkedin.com/advice/0/what-some-advantages-disadvantages-using-structured Example of a structured interview: https://www.youtube.com/watch?v=guUOmfq303s The Halo Effect: https://www.youtube.com/watch?v=biRZtmWZFrE The Halo Effect: https://www.youtube.com/watch?v=ACusVPT5iAw The Horn Effect: https://www.youtube.com/watch?v=gB8Sdl3i-bo The Horn Effect: https://www.youtube.com/watch?v=60yLTwyRxC0 The Halo and Horn Effects: https://thedecisionlab.com/biases/halo-effect Possible SAT: Design a process of selection for five top applicants for a specific industry or role. Evaluate the strengths and weaknesses of each method utilised.

W4	Motivation and Teamwork	
	MOTIVATION is the need, desire or want that drives a person's behaviour and gives it focus. • Having motivated employees is important for the success of an organisation. Unmotivated employees are unlikely to work as hard or be as productive. • Motivating the workforce isn't straightforward because everyone is motivated by different things for different reasons. **INTERNAL OR INTRINSIC MOTIVATION** comes from inside the individual. It's about feeling interested in, or getting pleasure from, doing a good job. This can mean that financial rewards are not always enough to provide sufficient motivation, and that people with intrinsic motivation may not be motivated to do a job they dislike, even when they are offered more money. **EXTERNAL OR EXTRINSIC MOTIVATION** is about rewards, such as money or a promotion. Externally motivated employees work on a task not for enjoyment, but for the reward it will bring. **MASLOW'S HIERARCHY OF NEEDS** represents needs that motivate humans. Initially, people are motivated by the most basic needs. When these are met, the next stage on the pyramid becomes their motivation.	Career Motivation Test: https://www.psychologytoday.com/us/tests/career/career-motivation-test What Motivates You? https://au.indeed.com/career-advice/interviewing/interview-question-what-motivates-you Intrinsic vs. Extrinsic motivation: https://www.youtube.com/watch?v=chpCYb52_wo How to motivate employees: https://www.youtube.com/watch?v=e6NzkAJtuJg Elton Mayo's Theory of Motivation: https://expertprogrammanagement.com/2018/05/mayos-motivation-theory-hawthorn-effect/ Elton Mayo's Research: https://politicalscienceblog.com/elton-mayo-human-relations-theory/#2_Relay_Assembly_Test_Room_Experiment_1927 Elton Mayo: The Hawthorne Experiment: https://www.youtube.com/watch?v=TIx5xovXDyc
	Managers can use Maslow's principles to motivate employees, no matter which level they are currently at. The key is to understand where individuals are in the hierarchy. **JOHN ADAMS** proposed the **EQUITY THEORY OF MOTIVATION**. It is based around the idea that employees expect a fair balance between what they put into work (inputs) and what they take out (outcomes). Employees tend to become unmotivated when they feel that their inputs (ability, education, effort, commitment) are greater than the outcomes (pay, benefits, recognition, responsibility etc) when compared to others. **HACKMAN AND OLDHAM'S THEORY** • The job characteristics model, designed by Hackman and Oldham, is based on the idea that the task itself is key to employee motivation. • Specifically, a boring and monotonous job stifles motivation to perform well, whereas a challenging job enhances motivation. • Variety, autonomy and decision authority are three ways of adding challenge to a job. **HACKMAN AND OLDHAM** identified the following job characteristics that must be in place to achieve employee satisfaction: **Skills Variety, Task Identity, Task Significance, Task Autonomy, Job Feedback.**	Maslow's Hierarchy of Needs: https://www.simplypsychology.org/maslow.html Worksheet: How does Maslow's theory apply to your life? http://msjohnstonenglish.weebly.com/uploads/2/6/2/9/26296334/pyramids__worksheets.pdf Worksheet: Understanding Maslow's hierarchy: http://wbphillipskhs.pbworks.com/w/file/fetch/106371072/Lesson-H-UI-L2.pdf How to motivate your staff: https://www.callofthewild.co.uk/library/theory/maslows-hierarchy-of-needs-how-to-motivate-your-staff/ Motivation at work according to Maslow: https://www.youtube.com/watch?v=J_Ri9uy878E The Equity Theory of motivation: https://www.youtube.com/watch?v=WRuE2oz-MC8 Equity theory: https://www.youtube.com/watch?v=x_YIM230b_0 Hackman and Oldham's theory: https://www.personio.com/hr-lexicon/hackman-and-oldham-model/ Hackman and Oldham's Job Characteristic Model: https://www.youtube.com/watch?v=tWBLeOD8SN8 Possible SAT: Explain how Hackman and Oldham's job characteristics can be applied to a worker's role to maximise levels of motivation. Class Discussion: Analyse an existing role or position and analyse why motivation levels may be low according to one of the motivation theories studied. This may be fictional, from a movie or short clip. Possible SAT: Design methods of motivation for workers at each level of Maslow's Hierarchy. Employee motivation in numbers: https://teamstage.io/motivation-statistics/#:~:text=Motivated%20employees%20are%2087%25%20less,likely%20to%20leave%20a%20company. Possible D&D Data Source: https://www.ipsos.com/sites/default/files/ct/publication/documents/2020-04/global_attitudes_toward_work_and_employment_-_rapport_complet.pdf

	TEAMWORK is essential to success in many organisations. Effective teamwork enables improved outcomes, such as achieving targets on time, and utilising a wide range of skills for a particular project. Business leaders view teamwork as so important that it is often classed as an essential skill in job advertisements. **AN EFFECTIVE TEAM HAS** • A common approach to working together. • A shared purpose or goal. • A task to complete in a certain time. • Complementary skills. • More than two members, but ideally less than nine. • Shared understanding. • Mutual Accountability. **TUCKMAN'S MODEL OF TEAMWORK** describes the stages that teams typically go through as they form, develop, and mature over time. Tuckman's model consists of four stages: Forming, Storming, Norming and Performing. **BELBIN'S TEAM ROLES** developed by Dr. Meredith Belbin in the 1970s, are a set of nine distinct roles that individuals can adopt within a team to contribute to its effectiveness and success. Belbin's theory emphasizes that a successful team requires a balanced combination of these roles, with each member contributing their unique strengths.	Steps for building a great team: https://hr.berkeley.edu/hr-network/central-guide-managing-hr/managing-hr/interaction/team-building/steps Tips for teamwork: https://www.outbackteambuilding.com/blog/best-teamwork-examples/ Teams that changed the World: https://www.workstyle.io/top-performing-team-case-studies Activity: Assign groups one of the 'teams that changed the world' and ask them to analyse why these teams were so successful, and then share back to the class. What were the similarities and differences between the teams? What makes a great sports team? https://www.abc.net.au/news/2020-07-26/what-makes-a-great-sports-team-sam-walker/12454814 Successful Teamwork – A case study: https://ro.ecu.edu.au/cgi/viewcontent.cgi?article=5007&context=ecuworks Tuckman's stages of team development: https://www.youtube.com/watch?v=Bz-LNmySibo Tuckman's Model Worksheet: https://ess220.files.wordpress.com/2008/02/tuckman-exercise-corrected.pdf Activity: Team Building with Myers Briggs: https://hr.berkeley.edu/team-building-myers-briggs%E2%80%94building-home-out-mm%E2%80%99s Belbin's Team Role Survey Belbin's Team Roles: https://www.youtube.com/watch?v=eFsA4wUf3I0 What is your conflict style? https://cuboulder.qualtrics.com/jfe/form/SV_6Kkp5kCHt628Zg1
W4	**Motivation and Teamwork**	
	ORGANISATION CULTURE refers to the values and beliefs of an organisation. The principles, ideologies as well as policies followed by an organisation form its culture. **SCHEIN'S THEORY OF CULTURE** According to Edgar Schein, organisations do not adopt a culture in a single day, instead it is formed in due course of time as the employees go through various changes, adapt to the external environment and solve problems. **SCHEIN'S THEORY** states that cultures have three elements: • Artifacts • Espoused Values • Basic Assumptions Most large organisations also have numerous **subcultures**, which consist of the core values of the dominant culture and additional values unique to the subculture. Subcultures form when a group of people within an organisation share a situation, problem, or experience that is unique to them. **Countercultures** have attitudes and values that do not align with the dominant culture of the company or organization, and cause friction and potentially long-term problems such as reduced productivity, or high staff turnover.	What is workplace culture? https://www.youtube.com/watch?v=gAnnyZMTPyc Australian Workplace Culture: https://thecultureequation.com.au/culture-transformation/australian-workplace-culture/ Worksheet: Analysing the culture of a company: https://thegrogroup.com/wp-content/uploads/2020/05/Culture-worksheet.pdf Activity – What is company culture? https://globalyouth.wharton.upenn.edu/wp-content/uploads/lesson_plans/what-is-company-culture.pdf Worksheet: Creating a Culture Statement: https://www.thecultureclimb.com/wp-content/uploads/2022/11/CULTURE-CLIMB-COMPASS-WORKSHEET.pdf Schein's Culture Theory: https://www.managementstudyguide.com/edgar-schein-model.htm Schein's 3 levels of Culture: https://www.youtube.com/watch?v=N37Foo0DOgE Organisational Subcultures: https://bonfyreapp.com/blog/organizational-subculture-good-bad Why workplace culture is everyone's responsibility: https://www.youtube.com/watch?v=P95eeEPCmlQ

	GOOD LEADERSHIP is essential for an organisation and its workers to perform well. **THE TRAIT THEORY** of leadership suggests that the most effective leaders are individuals who possess certain personality traits and attributes. This theory believes that some leaders are born rather than made. It also supports the idea that some individuals are predisposed to be better leaders than others. **BLAKE AND MOUTON'S MANAGERIAL GRID** also known as the Leadership Grid, is a leadership model developed by Robert R. Blake and Jane S. Mouton in the 1960s. The grid represents different leadership styles based on two fundamental behavioural dimensions: concern for people (employee welfare) and concern for production (task accomplishment). **DANIEL GOLEMAN'S LEADERSHIP THEORY** highlights the importance of emotional intelligence in guiding and influencing others. His theory centers around six leadership styles, each with its unique approach based on emotional intelligence: • Visionary Leadership • Coaching Leadership • Affiliative Leadership • Democratic Leadership • Pacesetting Leadership • Commanding Leadership Goleman suggests that effective leaders can adopt a flexible and adaptive leadership style based on the needs of the situation and the individuals they are leading. The best leaders are emotionally intelligent and can recognize which style is most appropriate in a given context to achieve the desired outcomes. Additionally, Goleman highlights that self-awareness, self-regulation, empathy, and social skills are key components of emotional intelligence that are crucial for effective leadership.	Class Discussion: What makes an effective leader? Who are some effective leaders from history? Examples of Leadership in the Army: https://anzacportal.dva.gov.au/sites/default/files/docs/decision-2017.pdf Traits, Skills and Types of Leadership: https://account.ache.org/eweb/upload/HolsingerCarlton_Chapter%203-81ea7b48.pdf The trait theory of leadership: https://www.verywellmind.com/what-is-the-trait-theory-of-leadership-2795322 Trait Theory of Leadership: https://www.youtube.com/watch?v=AESfTAJ3rpI Stories of effective leaders and their traits: https://www.sagepub.com/sites/default/files/upm-binaries/40977_2.pdf Activity: Leadership Styles: https://cdn.we.org/wp-content/uploads/2016/05/Part-2-Activity_Four_Leadership_Styles_May271.pdf Blake and Mouton's Managerial Grid: https://managementstudyguide.com/blake-mouton-managerial-grid.htm Blake and Mouton's theory: https://www.youtube.com/watch?v=ISvVdEKq9io Leadership statistics: https://teamstage.io/leadership-statistics/ Daniel Goleman's theory: https://www.nzequestrian.org.nz/wp-content/uploads/Six-Emotional-Leadership-Styles.pdf Emotional Intelligence by Daniel Goleman: https://www.youtube.com/watch?v=nEdhIESCYDc Goleman's 6 leadership styles: https://www.youtube.com/watch?v=i8RaWLcjqfg Quiz: What sort of leader are you? (Goleman): https://www.skillsyouneed.com/quiz/325444 Goleman's Leadership Questionnaire: https://judgementindex.co.uk/wp-content/uploads/2018/12/Leadership-Styles-Questionnaire.pdf Classroom Leadership Activities: https://www.utas.edu.au/__data/assets/pdf_file/0009/1363338/Activities-for-Leadership-Development.pdf

Suggestions for SHE Sources

Why are people with power more likely to make poor decisions? **https://theconversation.com/3-reasons-people-with-power-are-more-likely-to-make-bad-decisions-169017**

Is working from home good or bad for health? **https://theconversation.com/thinking-about-working-from-home-long-term-3-ways-it-could-be-good-or-bad-for-your-health-141374**

When introverts act like extraverts in the workplace: **https://theconversation.com/to-get-ahead-as-an-introvert-act-like-an-extravert-its-not-as-hard-as-you-think-151028**

How to deal with a Machiavellian boss: **https://theconversation.com/manipulative-distrustful-self-serving-how-to-deal-with-a-machiavellian-boss-209210**

'Nice' women earn less than assertive women: **https://www.sciencedaily.com/releases/2016/11/161121165245.htm**

Should you be friends with your co-workers? **https://theconversation.com/should-you-be-friends-with-your-co-workers-heres-what-the-research-says-209212**

Toxic culture in the workplace: **https://theconversation.com/behind-the-blue-wall-the-toxic-culture-that-left-a-vancouver-police-officer-dead-204743**

Fostering psychological safety in the workplace: **https://theconversation.com/fostering-psychological-safety-in-the-workplace-4-practical-real-life-tips-based-on-science-204661**

Rediscovering patience with the irate customer: **https://theconversation.com/the-rise-of-the-irate-customer-post-pandemic-rudeness-and-the-importance-of-rediscovering-patience-200740**

Elon Musk's management style: **https://theconversation.com/elon-musks-archaic-management-style-prioritizes-profit-over-people-195520**

Workplace bullying is a public health issue: **https://theconversation.com/workplace-bullying-should-be-treated-as-a-public-health-issue-190330**

Organisational Psychology SAT

PURPOSE

This task requires students to utilise the **Science Understanding** from the compulsory topic **Organisational Psychology** to design a job advertisement, determine the necessary skills and attributes of an employee, describe workplace culture, and plan a strategy for personnel selection.

General Capabilities required

- Literacy
- Critical and Creative Thinking
- Ethical Understanding
- Numeracy
- Intercultural Understanding
- Personal and Social Capability
- Information and Communication Technology

BACKGROUND

Adelaide Grammar School requires a new **Japanese teacher** with the ability to teach Japanese from Year 7 to Year 12.

YOUR TASK

Part 1: Determine the **Person Specification** for this role. Use the attached **brainstorming chart.**
Describe the soft skills, hard skills, experience and personality traits you are looking for.
Part 2: Write a statement regarding the **Culture** the school, guided by the principles of **Schein's Theory.** Include a discussion of the benefits of positive culture within a workplace.
Part 3: Design a **Job Advertisement and Position Description** for the Japanese Teacher position. You may choose to research how other schools present their job advertisements to guide you.
Consider the following:

- The teacher must support Christian values (and a Christian is preferred)
- The teacher must have experience in teaching Japanese
- The teacher should have a strong understanding of Japanese culture.
- The advertisement should be free from unconscious bias.

Part 4: Design a plan for Personnel Selection. Explain how you will determine which candidate is the best suited to the role. Your plan should include:

- How you will determine the top five candidates that will be interviewed. Which criteria will you use?
- A list of ten interview questions you will ask.

Part 5: Once a teacher is hired, they enter a 3-month probation period. Describe how their performance should be assessed throughout, and at the end of, this period.

Word Count: 1000 words (not including brainstorming diagrams)

	KNOWLEDGE AND APPLICATION
A	Demonstrates deep and broad knowledge and understanding of a range of psychological concepts. Applies psychological concepts highly effectively in diverse contexts. Communicates knowledge and understanding of psychology coherently, with highly effective use of appropriate terms, conventions, and representations.
B	Demonstrates some depth and breadth of knowledge and understanding of a range of psychological concepts. Applies psychological concepts mostly effectively in diverse contexts. Communicates knowledge and understanding of psychology mostly coherently, with effective use of appropriate terms, conventions, and representations.
C	Demonstrates knowledge and understanding of a general range of psychological concepts. Applies psychological concepts generally effectively in diverse contexts. Communicates knowledge and understanding of psychology generally effectively, using some appropriate terms, conventions, and representations.
D	Demonstrates some basic knowledge and partial understanding of psychological concepts. Applies some psychological concepts. Partially explores and recognises aspects of the interaction between science and society. Communicates basic psychological information, using some appropriate terms, conventions, and/or representations.
E	Demonstrates limited recognition and awareness of psychological concepts. Attempts to apply psychological concepts. Attempts to explore and identify an aspect of the interaction between science and society. Attempts to communicate information about psychology.

SOFT SKILLS

Essential

Desirable

HARD SKILLS
(Education and Qualifications)

Essential

Desirable

Person Specification for Japanese Teacher position

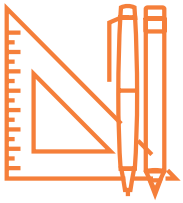
DESIRABLE PERSONALITY TRAITS

EXPERIENCE

Essential

Desirable

Suggested Extended Response Questions:



1. **The workplace has changed significantly over the past century.**
   - Explain two areas of change studied in this course.
   - Explain the impact of this change on workers and their wellbeing.
   - Discuss one way in which the operations of a workplace and their recruitment methods have changed to ensure inclusivity and diversity.

2. **Appraising employee performance is integral to the success of an organisation, and also provides workers the opportunity to celebrate their achievements and discuss their challenges.**
   - One method of appraisal is the Self Appraisal. Discuss the advantages and disadvantages of using this method.
   - Explain what a 360-degree appraisal is and evaluate the benefits of this option.
   - Compare and contrast the value of obtaining qualitative or quantitative data in conducting an appraisal.

3. **A company can only thrive when its employees have a sound level of wellbeing. Wellbeing encompasses both physical and mental health.**
   - Discuss some aspects of the workplace and the requirements of work that may risk an employee's level of wellbeing.
   - Suggest some strategies that may be used by the workplace to improve wellbeing in its workers.
   - Explain the indicators of employee wellbeing and how wellbeing of workers is closely linked to the success of an organisation.

4. **Finding the right job is important as it can significantly impact wellbeing, job satisfaction, and overall career success. Employers specify the skills needed in a role to attract suitable applicants.**
   - Suggest some of the considerations in finding a suitable job.
   - Discuss some of the indicators that a worker is currently employed in a job that doesn't suit them.
   - Evaluate the influence of personality on suitability for a particular role.
   - Explain the difference between soft and hard skills. Discuss why many employers are beginning to value soft skills more than hard skills.

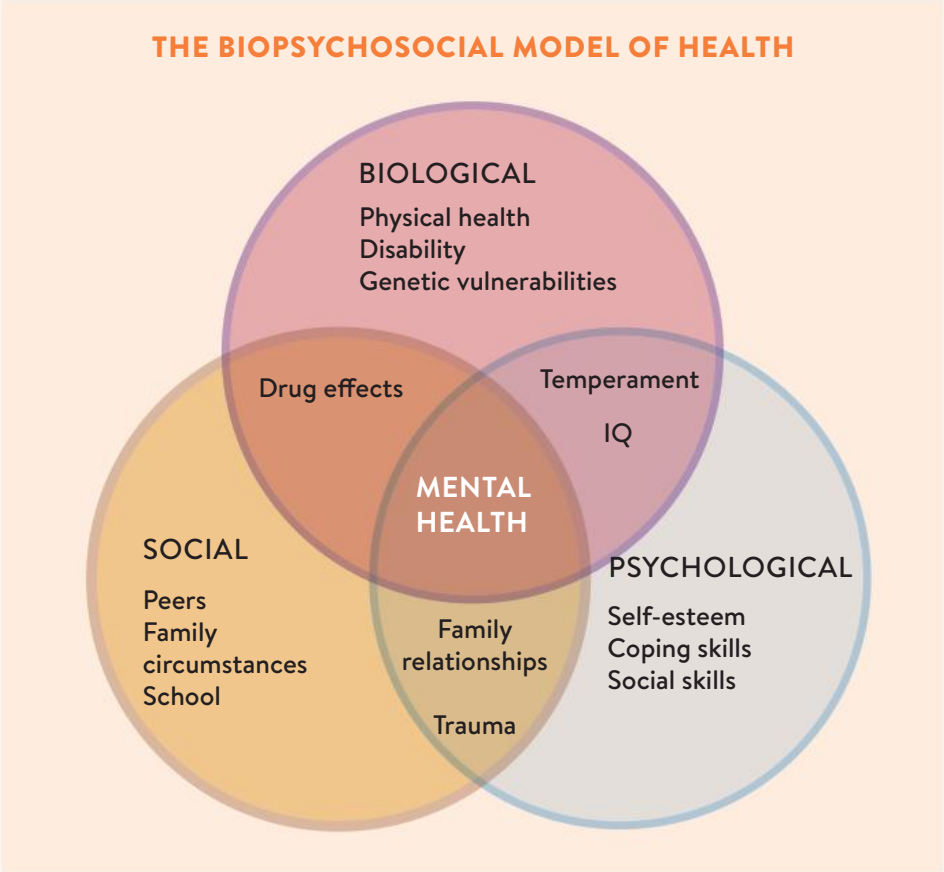
5. **When a position becomes available within an organisation, employers seek to employ the best person for the role.**
   - Interviews are one of the most common selection methods. Explain the value of a semi-structured interview.
   - Explain some of the key information that should be included in a suitable job advertisement.
   - Discuss the potential influence of employer biases including the Halo and Horn effects.
   - Explain one advantage and one disadvantage of contacting referees as part of the recruitment process.

6. **Motivation is the need, desire or want that drives a person's behaviour and gives it focus. Motivated employees exhibit higher levels of engagement and commitment to their tasks, leading to increased efficiency and better performance.**
   - Explain the difference between intrinsic and extrinsic motivation.
   - Discuss how Maslow's Hierarchy of Needs could be used by an employer to determine the most effective way to motivate their employees.
   - Explain Adam's Equity Theory of Motivation. How could an employer use this theory to create a workplace that is motivating for workers?

7. **Culture and leadership are critical factors that profoundly influence the organization's success, employee satisfaction, and overall performance.**
   - Using Schein's theory, discuss the three elements of culture: Artifacts, Values and Assumptions.
   - Explain the difference between a subculture and a counterculture in the workplace.
   - Discuss some of the traits that may be present in an effective leader in the workplace.
   - Daniel Goleman theorised that emotional intelligence was an integral factor in being an effective leader. Explain what he meant by this.

The Biopsychosocial Model in Organisational Psychology

The biopsychosocial model represents the theory that the consideration of **all** influences on thoughts, feelings and behaviour allows for a holistic understanding of the human psyche.



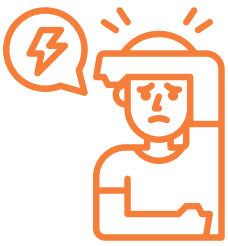
Biological factors refer to influences on the body and brain.

Social factors refer to the influence of social or cultural norms, and other people or groups.

Psychological factors refer to individual differences, including mood, emotional, personality, and personal attributes and characteristics.

Identify which aspect of the biopsychosocial model explains the following workplace behaviours:

1. Fatimah collaborated well with her team: .....
2. Catherine is a well organised employee: .....
3. Dylan's meditation practices improve his productivity: .....
4. Nathaniel views his shift-supervisor as a positive role model: .....
5. Baneet works hard to achieve an ATAR that will allow her to be a doctor:
6. Khang's boss values equality between employees in the workplace: .....
7. Brady finds it difficult to sleep after a stressful workday: .....
8. Molly's conscientiousness is valuable in her role as a secretary: .....
9. Hayley feels good about herself when a customer praises her: .....
10. Alex appreciates the free coffee to help wake him up in the morning: .....
11. Vu has a low self-esteem after being fired. .....
12. Brendan has formed strong friendships with his peers at work: .....



A BIOPSYCHOSOCIAL INFLUENCE CAN CAUSE A BIOPSYCHOSOCIAL BEHAVIOUR.

Example: A lack of sleep *(biological)* may cause poor teamwork *(social).*

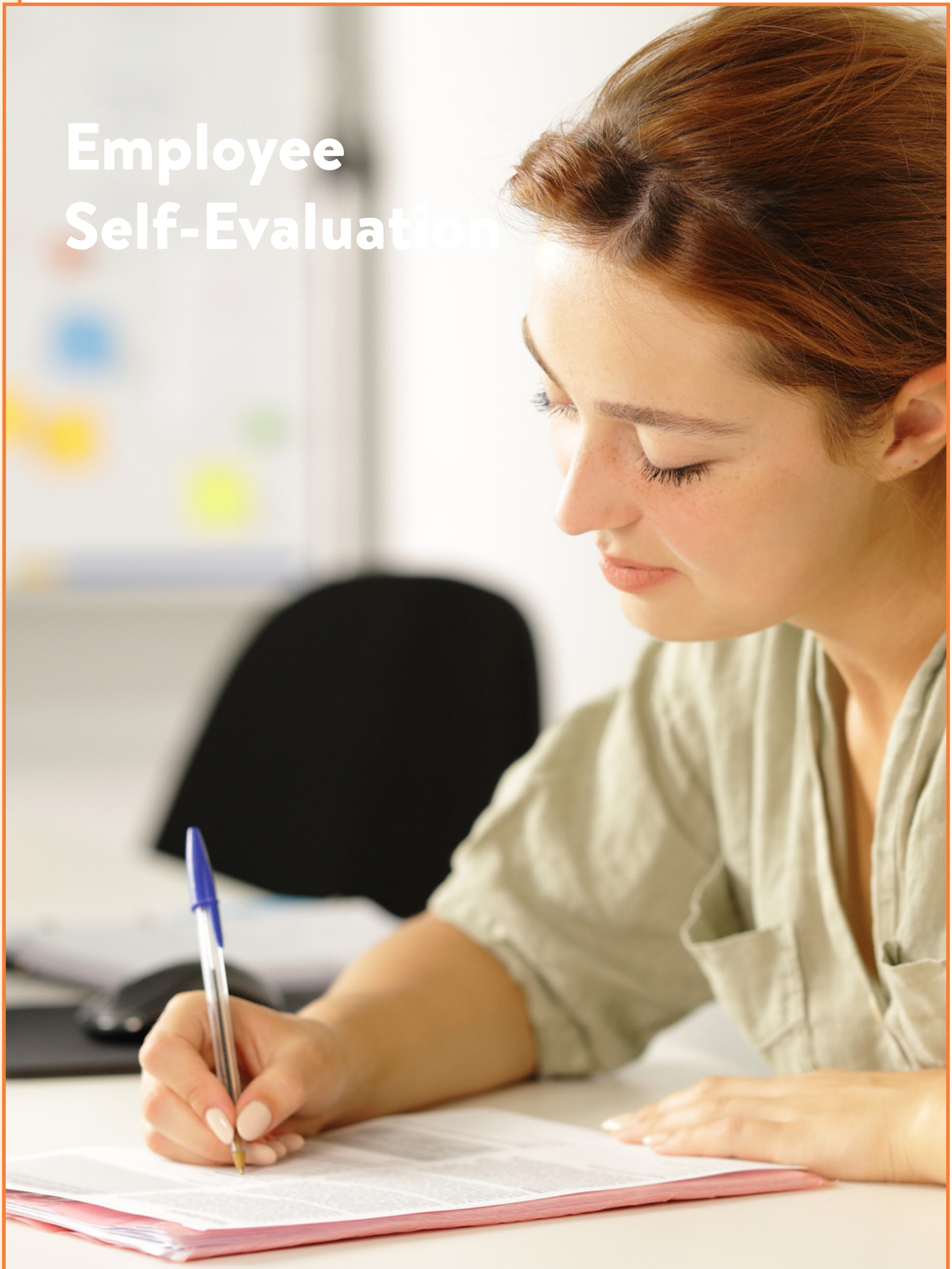
Identify which aspects of the biopsychosocial model are represented by the statements below:

1. Kane has a disability and is therefore highly compassionate towards new staff with disabilities.
2. Diezel has been bullied in the workplace which has decreased his self-esteem.
3. A strong company culture leads to feelings of emotional wellbeing.
4. Leah has strong organisational skills which decrease her stress levels.
5. Some companies provide healthy foods to their staff to improve performance.
6. Nihal has personality type ISFJ which makes her suitable for a role helping others.
7. The uncertain economic environment leads to anxiety in business owners.
8. Getting enough sleep can improve Noah's ability to handle conflict in the workplace.
9. Companies have begun to hire more females which increases women's feelings of self-worth.
10. Later retirement age causes Trinity to feel concerned.
11. Working remotely can be linked to lower levels of motivation and engagement.
12. The Focus Group method of gathering data can cause some people to dominate the conversation.

Now it's your turn! Give an example of how:

1. A social factor impacts an individual psychologically.
2. A biological factor impacts an individual socially.

Employee Self-Evaluation



Full Name

Employee ID

Position

Department

Entry Date

Date of Review

CURRENT RESPONSIBILITIES

How would you describe your main responsibilities?

Have these responsibilities changed over time?

Do you carry out any other tasks, and if so, which?

Is there anything in your work you would like to change, and if so, how would you do it?

What could your line manager do to help you be more successful in your job?

How do you think your department could improve?

PERFORMANCE VS ACHIEVEMENT

What action have you taken to fulfil your responsibilities?

Do you feel you've been successful during this period?

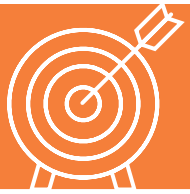
Do you think you could have done anything better?

How do you think you have contributed to our department during this period?

What are your main strengths?

In which areas do you feel you could improve?

GOALS AND OBJECTIVES



What objectives have you reached during this period?

Which ones did you not manage to achieve, and why?

What objectives do you propose for the next period?

Is there anything in your work you would like to change, and if so,

how would you do it?

What are your main strengths? What could your line manager do to help you be more successful in your job?

How do you think your department could improve?

PROFESSIONAL DEVELOPMENT

What training programmes have you taken part in?

Are there any areas you would like to train in?

Do you need extra resources or training to do your job?

What could your line manager do to help you achieve your professional development goals?

EMPLOYEE	MANAGER
Full name:	Full name:
Date:	Date:
Signature:	Signature:

ACTIVITY: 3 MEN'S WORK OR WOMEN'S WORK?

Identifying and analyzing traditional gender roles in the workplace
TIME: 100 MINUTES

DESCRIPTION:

Using the Occupation Checklist at the end of this activity, students will match jobs and careers to gender. The desired outcome from this activity will be the discovery and discussion of persistent gender stereotyping, with its wage and status implications, in terms of career opportunities.

OBJECTIVES:

Short Term

- To identify traditional career paths.
- To recognise non-traditional career opportunities.
- To analyse career paths.
- To listen attentively and with an open mind to all viewpoints.
- To present ideas and information clearly and concisely.

Long Term

- To develop independent thinking regarding standardized gender roles.
- To develop a strategy for choosing a career.

MATERIALS:

1. Occupation checklist
2. Library and Internet resources

PROCEDURE:

1. Introduction: Defining the occupations.
    - Hand out copies of "Occupation Checklist" to individual students.
    - Read off the listed occupations.
    - Describe any jobs that students might not be familiar with.

2. Have students fill out checklist, matching jobs and careers to 'Male,' 'Female,' or 'Both' by circling the correct response.
3. Poll the students on each occupation and write the result on the master checklist.
   There are many approaches to conducting the following class survey in a meaningful way.
   - Poll students on how and why they answered the way they did.
   - Have students conduct research of the occupations. You may want to divide students into groups and assign each group several occupations.
   - Another method would be to find out the areas of controversy, assign groups to research those areas.
4. **The class**, with instructor's help, **answers the following questions**. Ask for a student volunteer who will plot the results of the questions on the board.
   - Which group, "male" or "female", had the largest number?
   - Which jobs require working with people? Which group had the larger number?
   - Which jobs have the most "status," and, of those, how many are designated "males" and how many "females?"
   - Which jobs offer the most salary potential, and, of those, how many are designated "males" and how many "females?" This will require research to complete.
   - Which jobs require the most/least amount of education, and, of those, how many are designated "males" and how many "females?" Will also require research.
5. **Class should discuss any issues concerning gender as they arise**. The focus should always be steered to "WHY?" Why are some jobs traditionally gender designated? Why is there an inequity of wage and status along gender lines?

EVALUATION:

Assess students' completion of checklist; assess involvement in survey, group discussion and other assigned work.

RELATED ACTIVITIES:

1. For a math connection, have students create graphs of a variety of occupations to show percentage of male and female employees, wages for each gender, highest level of education for each gender, etc.
2. A research component has been touched on for this activity. While requiring more time and effort, researching specific occupations in terms of opportunity, availability, skills required, etc., would be a valuable and eye-opening experience for the students.
3. After research has been completed, have students choose one occupation to write a short research paper about.

FEMALE/MALE OCCUPATION CHECKLIST

Check whether you believe it is a male's occupation, female's occupation, or both.

JOB	GENDER		
Construction Worker	M	F	Both
Flight Attendant	M	F	Both
Social Worker	M	F	Both
Secretary	M	F	Both
Elementary Teacher	M	F	Both
Hair Stylist	M	F	Both
Model	M	F	Both
Store Clerk	M	F	Both
Veterinarian	M	F	Both
Physical Education Teacher	M	F	Both
Cook	M	F	Both
Photographer	M	F	Both
Nurse	M	F	Both
Computer Analyst	M	F	Both
Machinist	M	F	Both
Dental Assistant	M	F	Both
Artist	M	F	Both
News Reporter	M	F	Both
Telephone Operator	M	F	Both
NASA Technician	M	F	Both
CAD Specialist	M	F	Both
Pharmacist	M	F	Both
Baby-sitter	M	F	Both
Newspaper Editor	M	F	Both
Cashier	M	F	Both
Mechanical Engineer	M	F	Both
FBI Investigator	M	F	Both
Plumber	M	F	Both
Librarian	M	F	Both
Bank Teller	M	F	Both
Dietitian	M	F	Both
Licensed Practical Nurse	M	F	Both
Security Guard	M	F	Both
Day Care Worker	M	F	Both
Police Officer	M	F	Both
Bookkeeper	M	F	Both
Custodian	M	F	Both
Graphic Artist	M	F	Both
Technical Writer	M	F	Both
Lawyer	M	F	Both
Gardener	M	F	Both
Radio Announcer	M	F	Both

FEMALE/MALE OCCUPATION CHECKLIST (CONT.)

JOB	GENDER		
Forest Ranger	M	F	Both
Physical Therapist	M	F	Both
Occupational Therapist	M	F	Both
Speech Therapist	M	F	Both
Homemaker	M	F	Both
Accountant	M	F	Both
Musician	M	F	Both
English Teacher	M	F	Both
Auto Body Instructor	M	F	Both
Dairy Farmer	M	F	Both
Auto Mechanic	M	F	Both
Factory Worker	M	F	Both
Dietitian	M	F	Both
Gas Station Attendant	M	F	Both
Pilot	M	F	Both
Professional Athlete	M	F	Both
Computer Programmer	M	F	Both
Truck Driver	M	F	Both
Landscaper	M	F	Both
Bartender	M	F	Both
Clothing Designer	M	F	Both
Carpenter	M	F	Both
Physician	M	F	Both
Architect	M	F	Both

FORM 1: BELBIN'S SELF-PERCEPTION INVENTORY FOR TEAM ROLE ASSESSMENT[1]

1. Distribute 10 points per question among the sentences that you think best describe your behaviour. (You can distribute points among several sentences or allot all 10 points to a single sentence.)
2. Enter your scores in Table 1.
3. Transpose scores into Table 2 one line at a time.

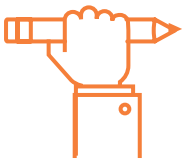
I WHAT I BELIEVE I CAN CONTRIBUTE TO A TEAM:		
a		I think I can quickly see and take advantage of new opportunities.
b		I can work well with a very wide range of people.
c		Producing ideas is one of my natural assets.
d		My ability rests in being able to draw people out whenever I detect they have something of value to contribute to group objectives.
e		My capacity to follow through has much to do with my personal effectiveness.
f		I am ready to face temporary unpopularity if it leads to worthwhile results in the end.
g		I can usually sense what is realistic and likely to work.
h		I can offer a reasoned case for alternative courses of action without introducing bias or prejudice.
Total	10	

[1] Belbin, R.M (1981) Management teams: why they succeed or fail, Heinemann, London

II IF I HAVE A POSSIBLE SHORTCOMING IN TEAMWORK, IT COULD BE THAT:		
a		I am not at ease unless meetings are well structured and controlled and generally well conducted.
b		I am inclined to be too generous towards others who have a valid viewpoint that has not been given a proper airing.
c		I have a tendency to talk too much once the group gets on to new ideas.
d		My objectives outlook makes it difficult for me to join in readily and enthusiastically with colleagues.
e		I am sometimes seen as forceful and authoritarian if there is a need to get something done.
f		I find it difficult to lead from the front, perhaps because I am over-responsive to group atmosphere.
g		I am apt to get too caught up in ideas that occur to me and so lose track of what is happening.
h		My colleagues tend to see me as worrying unnecessarily over detail and the possibility that things may go wrong.
Total	10	
III WHEN INVOLVED IN A PROJECT WITH OTHER PEOPLE:		
a		I have an aptitude for influencing people without pressuring them.
b		My general vigilance prevents careless mistakes and omissions being made.
c		I am ready to press for action to make sure that the meeting does not waste time or lose sight of the main objective.
d		I can be counted on to contribute something original.
e		I am always ready to back a good suggestion in the common interest.
f		I am keen to look for the latest in new ideas and developments.
g		I believe my capacity for judgment can help to bring about the right decisions.
h		I can be called upon to see that all essential work is organised
Total	10	
IV MY CHARACTERISTIC APPROACH TO GROUP WORK IS THAT:		
a		I have a quiet interest in getting to know colleagues better.
b		I am not reluctant to challenge the views of others or to hold a minority view myself.
c		I can usually find a line of argument to refute unsound propositions.
d		I think I have a talent for making things work once a plan has to be put into operation.
e		I have a tendency to avoid the obvious and to come out with the unexpected.
f		I bring a touch of perfectionism to any job I undertake.
g		I am ready to make use of contacts outside the group itself.
h		While I am interested in all views I have no hesitation in making up my mind once a decision has to be made.
Total	10	

V I GAIN SATISFACTION IN A JOB BECAUSE:		
a		I enjoy analysing situations and weighing up all the possible choices.
b		I am interested in finding practical solutions to problems.
c		I like to feel I am fostering good working relationships.
d		I can have a strong influence on decisions.
e		I can meet people who may have something new to offer.
f		I can get people to agree on a necessary course of action.
g		I feel in my element where I can give a task my full attention.
h		I like to find a field that stretches my imagination.
Total	10	
VI IF I'M SUDDENLY GIVEN A DIFFICULT TASK WITH LIMITED TIME AND UNFAMILIAR PEOPLE:		
a		I would feel like retiring to a corner to devise a way out of the impasse before developing a line.
b		I would be ready to work with the person who showed the most positive approach.
c		I would find some way of reducing the size of the task by establishing what different individuals might best contribute.
d		My natural sense of urgency would help to ensure that we did not fall behind schedule.
e		I believe I would keep cool and maintain my capacity to think straight.
f		I would retain a steadiness of purpose in spite of the pressures.
g		I would be prepared to take a positive lead if I felt the group was making no progress.
h		I would open up discussions with a view to stimulating new thoughts and getting something moving.
Total	10	
VII WITH REFERENCE TO THE PROBLEMS TO WHICH I AM SUBJECT IN WORKING IN GROUPS (WHICH OF THE FOLLOWING CAN YOU IDENTIFY WITH):		
a		I am apt to show my impatience with those who are obstructing progress.
b		Others may criticise me for being too analytical & insufficiently intuitive.
c		My desire to ensure that work is properly done can hold up proceedings.
d		I tend to get bored rather easily and rely on one or two stimulating members to spark me off.
e		I find it difficult to get started unless the goals are clear.
f		I am sometimes poor at explaining and clarifying complex points that occur to me.
g		I am conscious of demanding from others the things I cannot do myself.
h		I hesitate to get my points across when I run up against real opposition.
Total	10	

TABLE 1. SUMMARY OF SELF-SCORING



SECTION	a	b	c	d	e	f	g	h	S
I									10
II									10
III									10
IV									10
V									10
VI									10
VII									10

TABLE 2. CALCULATION OF ROLES

1. Transpose the scores from Table 1, Enter them section by section in Table 2. (For example, if you have a 5 in Row **I**, Column **C** of Table 1, it will be placed in Row **I**, Column **PL** of Table 2 as indicated by the **C** on the LHS of this cell.)
2. Add up the points in each column to give a total team-role score.
3. Divide by the shown amount to calculate a relative team-role score.

SECTION		I		CO		SH		PL		RI		ME		TW		CF
I	G		D		F		C		A		H		B		E	
II	A		B		E		G		C		D		F		H	
III	H		A		C		D		F		G		E		B	
IV	D		H		B		E		G		C		A		F	
V	B		F		D		H		E		A		C		G	
VI	F		C		G		A		H		E		B		D	
VII	E		G		A		F		D		B		H		C	
TOTAL																
Divide by[2]:		10		7		8		8		8		10		12		7
SCORE																

[2] These scores are the average for 2nd year chemical engineering students. As average scores differ greatly depending on the background of the group being tested, it is recommended that averages be compiled for the group being tested

RESOURCE 1: INTERPRETING BELBIN'S TEAM ROLES INVENTORY

SCORE	INTERPRETATION
0 – 0.5	You are weak in this particular category. This does not mean that you cannot take on this role but that if you do, you will need to be aware that to be successful will require you to push yourself and to operate outside your comfort zone.
0.5 – 0.9	This will not be your preferred category but one which you could take on if there is an overall team weakness in this area.
0.9 – 1.1	You perform adequately in this category and are on a par with people from the same background as yourself.
1.1 – 1.5	This is a preferred role and one that you are quite adept at filling. However you may fall back on a lesser role should someone be stronger than you in this role or should there be a weakness in the team with respect to your lesser role.
[3] 1.5	You are very strong in this role; it is highly probable that this is the role that you will undertake for the team.

The following should be noted:

- it is usual for the leader of the team to be the person with a high (perhaps the highest) score in either the shaper or coordinator categories;
- the team usually has only one leader and the stronger of the shapers or coordinators will fill this role;
- all of the roles need to be fulfilled to achieve team success;
- teams that lack people with particular attributes will not fail as awareness of the weakness should encourage additional effort by one or more of the team members to cover the requirement;
- your scores will change throughout your life with personal development and experience;
- you are not typecast into the roles predicted by Belbin – the questionnaire should only be used to make you aware of your strengths and weaknesses.

RESOURCE 2: BELBIN TEAM ROLES

TEAM ROLE	TYPICAL FEATURES	WEAKNESSES	
		Allowable	**Non-allowable**
IMPLEMENTER Turns ideas into practical actions. Works well across board.	Disciplined, reliable, conservative, efficient	Inflexible. Slow to respond to possibilities.	Obstructing change.
COORDINATOR Adept at handling personal relationships. Clarifies goals, promotes decision-making, delegates well.	Mature, confident, a good chairperson	Manipulative. Delegates personal work.	Taking credit for the effort of a team.
SHAPER Achievers, most likely to be promoted. Has the drive and courage to overcome obstacles.	Challenging, dynamic, thrives on pressure.	Can provoke others. Hurts people's feelings.	Inability to recover situation with good humour or apology.
PLANT Usually squeezed out of organisations to reappear as consultants.	Creative, imaginative, unorthodox. Solves difficult problems.	Ignores practical details. Too preoccupied to communicate effectively.	Strong 'ownership' of idea when co-operation required.
RESOURCE INVESTIGATOR Explores opportunities. Develops contacts. Sociable and generally tolerant.	Extrovert, enthusiastic, communicative.	Over optimistic. Loses interest once initial enthusiasm has passed.	Letting clients down by neglecting to follow-up arrangements.
MONITOR EVALUATOR Sees all options. Judges accurately. Needs to be supported.	Sober, strategic and discerning. Low profile.	Lacks drive and ability to inspire others. Overly critical.	Cynicism without logic.
TEAM WORKER Listens, builds, averts friction, calms the waters. Easiest to work with.	Co-operative, mild, perceptive and diplomatic.	Indecisive in crunch situations. Can be easily influenced.	Avoiding situations that may entail pressure.
COMPLETER FINISHER Searches out errors and omissions. Delivers on time. Invaluable for quality product.	Painstaking, conscientious, anxious.	Inclined to worry unduly. Reluctant to delegate. Can be a nit picker.	Obsessional behaviour.

STEP	DESCRIPTION	LIST	PLAN
ONE **My reasons for being at work**	Remind yourself why you work in your current job. If you're going to do a good job, it's important to look after your mental health and wellbeing.	**List as many of your personal reasons for being at work as you can below.** Examples: · For career development · To put food on the table and pay the bills · Because the organisation aligns with my personal values	**This year, I will focus on:** Examples: · Taking time out for myself and not feeling guilty for it. · Doing one small act of kindness for a stranger or loved one every week. · Nourish my body: go to the dentist, visit the GP for regular health check-ups and incorporate more fruits and vegetables into my diet.
TWO **My triggers**	Its likely certain things raise your stress levels and make distressing or challenging situations more difficult to manage. If you know what your triggers are, then you can anticipate them and put strategies in place to manage them effectively.	**List as many things that could cause you stress below.** Examples: · Not asking for support when I need it · Not taking enough breaks · Hunger	
THREE **My warning signs**	Warning signs are changes in thoughts, moods or behaviours that suggest you may be experiencing stress or burnout. Knowing your warning signs can help you take action early.	**List as many of your own personal warning signs as you can below.** Examples: · Struggling to keep up with usual workload · Having trouble sleeping · Negative 'self-talk'	
FOUR **Engage in positive work habits**	Small actions that improve your personal work environment can help you feel more at ease in times of stress, and in the long term, prevent burnout.	**List the things you believe you can do by and for yourself to maintain your wellbeing.** Examples: · Go for a walk outside · Clean your desk space · Listen to music	

FIVE **Create a positive and engaging environment for others**	Doing things for others is sometimes the best thing we can do for ourselves. Even if it's just honest gratitude, small acts of kindness quickly add up.	**List the things you believe you can do with and for others to maintain your wellbeing.** Examples: · Offer to assist another workmate with their workload · Compliment or congratulate a workmate · Go for a walk or grab a coffee to check-in with a workmate	**This year, I will focus on:** Examples: · Taking time out for myself and not feeling guilty for it. · Doing one small act of kindness for a stranger or loved one every week. · Nourish my body: go to the dentist, visit the GP for regular health check-ups and incorporate more fruits and vegetables into my diet.
SIX **Friends, family and workmates I can talk to**	Trusted friends, family and workmates can help you feel better by providing practical support, or just being there to listen.	**Write down the names and contact details of your main supports. Try to include at least one person in your workplace.** Examples: · Workmate/coffee buddy – ph. · Best friend – ph. · Mum/Dad – ph. **If you don't feel as though you can talk to friends, family or a workmate, below are some options for support:** · Your workplace Employee Assistance Program · The Beyond Blue online forums · Online and phone mental health resources · Lifeline 13 11 14	
SEVEN **Professional support**	Professional support is always available when you need it. List the names, numbers and/or locations of mental health professionals, crisis teams, hospitals and support services you can contact. In an emergency, always call 000.	**My contacts:** · My GP or mental health professional · Beyond Blue Support Service 1300 22 46 36 · MensLine Australia 1300 78 99 78	

Topic 3:

Cyberpsychology

Introduction

Cyberpsychology is a modern field of psychology that focuses on the interactions between humans and machines. In general, there are five main areas of cyberpsychology: online behaviour, social media use, telepsychology, video gaming, and virtual reality (VR) and artificial intelligence (AI). Technology has become an extension of ourselves and our lives through the use of social media applications, computers and smartphones. Cyberpsychology is interested in studying the ways in which humans design and engineer technology and the ways in which interactions with technology change human psychology. We know that events in the face-to-face world such as the Arab Spring and Black Lives Matter protests were influenced by online interactions and that these have the power to change the political landscape of our world. We are also becoming increasingly aware of the ways in which artificial intelligence can become useful to us, but should also be designed carefully to avoid violating ethics and becoming dangerous.

This is a rapidly growing field and is still finding ways in which it can inform other areas of science and technology design as well as governments and safety recommendations. The largest use of psychology in technology design has been through the marketing and algorithms aimed at keeping users online or playing games, but with an increasing understanding of the detrimental effects of chronic technology dependence and addiction, psychologists are now providing research that will help to tackle these issues.

WEEK	TOPIC CONTENT	RESOURCES
W1	**Psychology of technology reliance**	
	LEARNING WITH TECHNOLOGY USE Operant conditioning involves the use of a reward to reinforce a certain behaviour. These rewards can be physical, such as a treat for a dog, intangible, such as 'hit points' in a game or social, such as a smile or laugh. **Activity**: Explore the ways in which technology can give us intangible and social rewards. Classical conditioning involves creating an association between stimuli that are otherwise unrelated. The pairing must occur several times, unless the experience involves pain or fear in which case, it only needs to occur once for an association to be formed. **Activity**: Explore the ways in which we might associate technology with certain emotions of experiences through classical conditioning. **Activity**: Discuss the ethical issues involved with game and social media app design.	https://www.youtube.com/watch?v=H6LEcM0E0io https://www.nature.com/articles/s41467-020-19607-x https://www.youtube.com/watch?v=1ypOUn6rThM https://dalegphoto.com/how-social-media-takes-advantage-of-your-brain-and-what-to-do-about-it https://medium.com/interactive-designers-cookbook/modern-use-of-classical-conditioning-438392d2e6e8
	PROBLEMATIC TECHNOLOGY USE The absence of a reward can be distressing when it is expected. This is the basis of technology dependence or addiction. **Dependence**: the process by which your mind and body come to depend on a substance or object to make you feel a certain way. This can result in withdrawal symptoms when the substance or object is not received. **Addiction**: a brain disorder that involves compulsive behaviours despite negative outcomes. This is a more complex condition that involves the reward system in the brain. **Activity**: Reflect on your relationship with technology; are you dependent or addicted? The brain's **Mesolimbic reward pathway** can lead to addiction. When a positive stimulus is experienced, neurons in the ventral tegmental area send **dopamine** (our 'feel good' hormone) to the nucleus accumbens, amygdala, prefrontal cortex and hippocampus. This in turn becomes a reward for the behaviour it follows. When our brain pathways are trained enough through experience of the stimulus-reward pairing, it will begin to expect the dopamine release. * possible link to Neuropsychology topic **Activity**: Explore the intentional ways in which social media and gaming companies use conditioning to encourage continual use of their products. Discuss the ethical implications of these. **Nomophobia** is an irrational fear of being without your mobile phone. Although this is not yet a recognised psychological condition by the DSM-IV, there is a growing understanding about the fear and its impacts on mental health.	https://www.sciencetimes.com/articles/27290/20200914/social-media-addiction-ways-counter.htm https://www.healthline.com/health/psychological-addiction https://sitn.hms.harvard.edu/flash/2018/dopamine-smartphones-battle-time/ https://www.youtube.com/watch?v=f7E0mTJQ2KM http://jmbpsych.weebly.com/uploads/4/7/3/7/47374127/nmp-q_survey.pdf https://www.healthline.com/health/anxiety/nomophobia
	TECHNOLOGY AND STRESS Technology dependence and use can also lead to high levels of **stress**. They do this by encouraging the release of **cortisol** and **adrenaline** as a stress response to help you deal with the situation being faced. This activates the 'fight-or-flight' response by the sympathetic nervous system of the body. *possible link to Neuropsychology topic When people experience stress too often or for long periods of time (chronic stress) it can have detrimental effects on the immune system. **Activity**: Record 5 minutes of you own gameplay or social media use, then chart your adrenaline and dopamine releases based on what you experienced over that time. SIS	https://www.simplypsychology.org/stress-biology.html https://www.youtube.com/watch?v=v-t1Z5-oPtU https://www.apa.org/topics/stress/body#:~:text=The%20consistent%20and%20ongoing%20increase,%2C%20heart%20attack%2C%20or%20stroke.

W2	Social Influences online	
	POSITIVE SOCIAL INFLUENCE ONLINE **Memes** are an element of culture or a system of behaviour that is passed between humans and often carries symbolic meaning on a particular theme. While they have always been in existence, the nature of online communication has meant their speed of spread is increasingly rapid making it difficult to keep up with contemporary moments in culture. There are a number of psychological theories that explain our behaviour in an online environment. **Social exchange theory**: according to psychologists we exchange social currency (e.g. loyalty, support, affection) with others in order to maximise social 'profits' and minimise social 'losses'. **Reciprocity principle**: this refers to the giving and taking in relationships for mutual benefit. For example, giving someone a birthday present because they did the same for you. **Activity**: Describe a situation in which you have experienced either social exchange theory or the reciprocity in your online behaviour using psychological terms.	https://cognitiontoday.com/psychology-of-memes-advanced-emotions-outsourced-thoughts-mental-health/ https://www.verywellmind.com/what-is-social-exchange-theory-2795882 https://www.gamedeveloper.com/design/game-design-and-the-reciprocity-effect-in-social-games https://www.youtube.com/watch?v=H7xw-oDjwXQ&t=7s
	BEHAVIOUR CHANGES DUE TO SOCIAL INFLUENCE ONLINE In some cases, we see people acting very differently online from what they would in face-to-face interactions. Psychologists have studied why this might be the case. The **SIDE model** refers to a theory about how **anonymity** and identifiability impact group behaviour. SIDE stands for the Social Identity Model of Deindividuation Effects. **Activity**: Explain ways in which anonymity could be both helpful and unhelpful to people online. By no longer separating their personal identity from the **group identity**, people sometimes stop following social norms and instead **conform** to the group's norms. **Social norms** are unspoken rules held by society that maintain healthy function. e.g. Waiting for people to get off the bus/train before you get on. **Group norms** are unspoken rules that guide how group members interact and behave when in each other's presence. **Netiquette** refers to the rules of conduct for respectful and appropriate communication online. **Activity**: Discuss healthy and unhealthy social norms in online forums such as an online game or social media group.	https://psychology.fandom.com/wiki/Social_Identity_model_of_Deindividuation_Effects_(SIDE) https://www.kaspersky.com/resource-center/preemptive-safety/what-is-netiquette
	NEGATIVE BEHAVIOUR ONLINE Arguments and misconceptions between people online can be explained with psychological concepts such as confirmation bias and group polarisation. **Confirmation bias**: a tendency to search for information that supports our preconceptions and to ignore or distort contradictory evidence. **Availability Heuristic:** the tendency to estimate the likelihood of an event based on how available a similar circumstance is in our memory. Events that come easily to mind can cause us to believe they occur more often. **Overconfidence:** the tendency to overestimate how accurate our beliefs and judgements are. We tend to be more confident than correct. **Belief Perseverance:** the tendency to cling to our initial belief even when given evidence to the contrary. **Cognitive Dissonance:** the tendency to create an excuse to relieve our feelings of discomfort when our actions do not match our beliefs. **Framing:** the tendency to change our judgements or decisions due to the way an issue is posed or worded. **Group polarisation**: the tendency in a group discussion for people to shift to a stronger position in the same direction as their previously held view. **Activity**: Find an example of an argument in an online forum and explain how one of the ideas above can be used to explain the behaviour.	https://www.verywellmind.com/cognitive-biases-distort-thinking-2794763 https://health.clevelandclinic.org/cognitive-bias/ https://medium.com/dnnmedia/social-media-echo-chambers-and-our-own-confirmation-bias-fcd89d7fa11c https://online.utpb.edu/about-us/articles/psychology/lost-in-the-crowd-the-phenomenon-of-group-polarization/ https://www.brookings.edu/articles/how-social-media-platforms-can-reduce-polarization/

W3	**Technology impacts on Health**	
	TECHNOLOGY AND SLEEP **Sleep** is important for maintaining healthy bodies and minds. Circadian sleep rhythms are the body's internal clock that responds to light in order to release **melatonin** (a hormone) at night to increase the likelihood of sleep. Teenagers need 8 – 10 hours sleep each night to ensure healthy functioning. Teens also experience a phase shift in their circadian rhythms, meaning that they have a tendency to go to bed later and wake up later. Often the screens we look at have **blue light** as their main wavelengths. Blue wavelengths are beneficial during daylight hours because they boost attention, reaction times, and mood. This is useful for when you want to stay awake and concentrate on certain tasks, but as we near bedtime it can give our brains an artificial sense of sunlight. This means that the melatonin release is delayed and we do not 'feel' tired even though our body craves sleep. Some people experience so much anxiety about online activities that they wake up to check their phone throughout the night. Other issues with technology use include becoming too alert through activities such as video gaming at night or putting off sleep time due to becoming too absorbed in an activity. **Activity**: Suggest some ways that adults, teenagers and children can be protected from sleep disruption due to technology. **Deconstruct and Design Investigation ideas:** use the 'Screen time' or 'Digital wellbeing' within 'Settings' apps on smartphones to measure phone use reliably. Use this to investigate the impacts of using social media or phone games on an aspect of wellbeing (e.g. sleep time/quality, anxiety levels, mood, etc.)	https://www.youtube.com/watch?v=KT4uOE7vI-w https://www.sleephealthfoundation.org.au/sleep-topics/teenage-sleep https://www.health.harvard.edu/staying-healthy/blue-light-has-a-dark-side
	SELF-ESTEEM AND FOMO **Self-esteem** and body image can be impacted by social media use through comparisons with others in your 'peer group'. Self-esteem describes a person's overall subjective evaluation of their worth or value. Our **self-image** is often a construction of various reflections from others. In the online world, this is more open to distortion as we often only see a curated version of people's lives. If we only see the best of people, we feel a stronger need to keep up with this image of perfection. If a person's self-esteem is linked to the way they look, this constant comparison can become overwhelming. In some cases this can lead to **body dysmorphic disorder**, anxiety or depression. Body dysmorphic disorder is a condition where a person can't stop thinking about a perceived flaw in their body. Feelings of **FOMO** or Fear of Missing Out can arise due to online observations of others. People can 'see' that their friends are enjoying activities without them or that discussions are being had without their input. This can make people feel anxious about being left out and can stop them from resting or turning off from technology. This can lead to anxiety, feelings of worthlessness and depression. **Activity**: Come up with scenarios that might cause a variety of different people to feel FOMO. One way to combat feelings of comparison with others is to spend time working on your social interaction with off-line activities. Collaborating on projects or playing games with others helps to build **resilience** and self-esteem through increasing **self-confidence**. **Activity**: Use the biopsychosocial model of health to analyse either the impact of low self-esteem or the impacts of self-confidence building activities on teenage health.	https://theconversation.com/how-social-media-can-crush-your-self-esteem-174009 https://youtu.be/3xbHq7UsozA https://www.betterhealth.vic.gov.au/health/conditionsandtreatments/body-dysmorphic-disorder-bdd https://www.verywellmind.com/how-to-cope-with-fomo-4174664

	IMPRESSION MANAGEMENT AND SOCIAL COMPARISON **Impression formation** involves formulating tentative conceptions about others' emotions, motivations and personalities by gathering and interpreting situational and behavioural cues. Just as we form impressions of others they also form impressions of us. We can manage these impressions by using knowledge of how they are formed. **Verbal communication:** **Semantic level**: disclosure, questions, information, acknowledgement, confirmation. **Expressive level**: friendly vs hostile. **Non-verbal communication:** personal appearance, kinesics, proxemics, physical environment, chronemics, haptics. **Activity**: Describe a situation where you would want to present a particular image to someone you are meeting for the first time. Explain how you would manage their impression by using verbal and non-verbal communication. **Social comparison theory** states that we form our impressions of ourselves through comparison to others. **Upwards comparison:** comparing yourself to someone who is perceived to be performing better than you are. **Downwards comparison:** comparing yourself to someone who is perceived to be performing worse than you are. **Activity**: Discuss how these forms of comparison could lead to unhealthy thoughts, feelings and behaviours.	https://www.linkedin.com/pulse/art-nonverbal-communication-jared-stier https://dyi9.medium.com/i-made-me-a-look-at-online-impression-management-f1dbfb4c2ad5 https://jedfoundation.org/resource/understanding-social-comparison-on-social-media/ https://www.youtube.com/watch?v=OII2Hd6fNd0
W4	**Cyberbullying and the impacts**	
	CYBERBULLYING **Cyberbullying** is a sub-type of verbal and/or social bullying carried out through technology, such as using the internet and mobile devices. It includes harmful written words/images/videos intended to insult or cause emotional pain and may lead to social isolation of a person through attack of their social standing. **Activity**: Discuss the ways in which cyberbullying is different from face-to-face bullying. Cyberbullying behaviours include: Flaming (insulting), trolling, exclusion, denigration (slander), outing/doxing, trickery, impersonation and cyberstalking.	https://vimeo.com/187604619
	THE BYSTANDER EFFECT People can be **victims**, **perpetrators**, or **bystanders/upstanders** in instances of cyberbullying. The **bystander effect** is a psychological theory stating that people are more likely to be apathetic towards helping others if there are other people present. **Diffusion of responsibility** occurs when people no longer take personal responsibility when others are present. This can apply to cyberbullying if it takes place in a public forum and bullying offline can be recorded on a personal device to later post on social media.	https://www.verywellmind.com/the-bystander-effect-2795899 https://www.adelaidenow.com.au/south-australia-education/schools-hub/underdale-high-students-suspended-over-school-brawl-video/news-story/d724193fdcdc64fe2d445b-ba04ff3152
	CYBERBULLYING AND HEALTH Victims can live in a state of high arousal or stress due to their fear of being 'attacked' online. This can lead to high anxiety levels which can weaken the relationship between the amygdala and the pre-frontal cortex leading to less rational thinking. Stress also shrinks the hippocampus, reducing the amount of memory storage and allowing people to remember negative events better than positive events. Cyberbullying tends to be more prevalent amongst teenagers. This is concerning as adolescents are still forming their self-image and use the opinions of others to help them do this.	https://www.verywellfamily.com/what-are-the-effects-of-cyberbullying-460558 https://www.esafety.gov.au/key-issues/cyberbullying https://www.esafety.gov.au/parents/issues-and-advice/are-they-old-enough https://www.aihw.gov.au/suicide-self-harm-monitoring/data/populations-age-groups/suicide-among-young-people

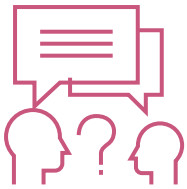
	Activity: Use SHE concepts to explore how psychology research into cyberbullying of teens is being used to inform government recommendations around social media and gaming use. How could we develop solutions to prevent the occurrence of cyberbullying amongst adolescents at a local, global and national level? Cyberbullying can lead to mental illness, self-harm and attempts at suicide if people do not seek help. There has been a rise in all three of these areas since the invention of personal mobile devices that have access to the internet. **Activity**: Use the biopsychosocial model of health to analyse the impacts of cyberbullying.	https://humanrights.gov.au/our-work/commission-general/cyberbullying-human-rights-and-bystanders-0 Websites for a **SHE Task on an anti-cyberbullying initiative.** https://stopcyberbullying.org.au/ https://thebullyproject.com.au/ https://www.bullyzero.org.au/ https://www.cybersmile.org/what-we-do https://www.thepolitetype.com/ https://www.stompoutbullying.org/
W5	**Technology and therapy**	
	TELEHEALTH/E-THERAPY **Telehealth** is the administration of psychological therapy through the use of video conference or phone call. **E-therapy** is any therapy that involves the use of the internet. These can be especially helpful to those in remote areas who wouldn't otherwise have access to mental health professionals. In response to the COVID-19 pandemic, in 2022 the Australian Government Department of Health and Aged Care made universal access to telehealth services ongoing. This means that eligible patients throughout Australia have access to health services via video conference/phone call where it is deemed clinically appropriate. **Artificial Intelligence** (AI) chatbots may also be the future of psychotherapy to make it more accessible and less expensive. There are a number of therapy chatbots on the market already.	https://vimeo.com/432539953 https://www.sahealth.sa.gov.au/wps/wcm/connect/0c1d7b36-1de1-4080-bbab-53100c79a05b/Mental+Health+Digital_Telehealth_Consumer_Brochure_final_31_July_2012.pdf?MOD=AJPERES&CACHEID=ROOTWORKSPACE-0c1d7b36-1de1-4080-bbab-53100c79a05b-nzL1PI3 https://positivepsychology.com/e-therapy/ https://psychology.org.au/for-members/publications/inpsych/2020/june-july-issue-3/why-have-psychologists-been-slow-to-adopt-teleheal https://www.makeuseof.com/ai-chatbot-therapist-mobile-apps-pocket/

	VIRTUAL REALITY IN THERAPY The use of **virtual reality** (VR) as an augmentation of traditional therapy is a growing field within psychology. The main uses include exposure therapy for treatments of phobias and anxiety, post-traumatic stress disorder (PTSD), and addictions and cognitive behaviour therapy for social or generalised anxiety disorders and depression. Often this can recreate difficult or expensive situations such as aeroplane flight, with lower costs. It is important to note that VR therapy must be used in conjunction with other treatments and by a registered clinician. Phobias that have been treated with VR include: **Arachnophobia** – an intense fear of spiders **Aviophobia** – an extreme fear of flying **Agoraphobia** – the fear of open spaces and situations where escape is not possible **Claustrophobia** – an intense fear of being trapped in small spaces **Glossophobia** – the fear of public speaking. VR environments can provide safe, controlled and ecologically valid situations making them more standardized but also easy to adjust for individual cases. It is becoming increasingly realistic with the use of haptic gloves and suits that can simulate touch and even temperature changes. Psychological (MRI) and physiological (heart rate, GSR, etc.) responses to the VR experience can be measured and monitored throughout the experience to use biofeedback in real time. VR can also be used in pain treatment and stress by providing distraction, meditation and breathing exercises which may lead to faster recovery times. It has also been used for treating dementia through the use of reminiscence and cognitive stimulation.	https://youtu.be/0dykDURQx_c https://www.frontiersin.org/articles/10.3389/fpsyt.2019.00773/full https://www.nationalelfservice.net/treatment/digital-health/virtual-reality-mental-health/
	GAMING THERAPY Since the COVID-19 pandemic, gaming therapy has become increasingly popular as a way for clinical psychologists to connect with younger people. Some games as designed to highlight mental health issues, while others can be used for building resilience, collaboration, flexible thinking and social skills. New products in VR use peer support environments to assist in self-help therapy. Although these have no scientific evidence of their efficacy, it is a growth area in the field. One well-known study by Holmes et. al. in 2009 showed that playing Tetris thirty minutes after experiencing a traumatic experience, reduced the likelihood of PTSD 'flashbacks' by competing for visuospatial resources and stopping consolidation of memory. Another game has been designed to help children with ADHD to improve attention.	https://www.wired.com/story/online-gaming-is-the-new-therapists-office/ https://www.webmd.com/mental-health/mental-health-benefits-of-video-games https://youtu.be/pFDv2K85t-A https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0004153 https://www.theverge.com/2020/6/15/21292267/fda-adhd-video-game-prescription-endeavor-rx-akl-t01-project-evo
	Other possible areas of exploration	
	ARTIFICIAL INTELLIGENCE **Artificial intelligence** is generally defined as the ability of a machine to simulate human intelligence. There are two types of AI; **artificial general intelligence** can perform any intellectual task a human can and is still in development, while **narrow AI** can only perform specific tasks and is already being used for applications such as spam filtering and facial recognition. **Machine learning** is a type of AI that learns without having to be explicitly programmed.	https://www.youtube.com/watch?v=c0m6yaGlZh4 https://youtu.be/4VROUIAF2Do https://www.ibm.com/topics/machine-learning https://www.youtube.com/watch?v=Rh9vBczqMk0 https://quickdraw.withgoogle.com/

	The **Turing test** was designed to determine whether a computer was able to think like a human being. To pass the test the machine must convince a human operator that it is another human. Although several computers have passed the test by convincing over 50% of judges, no computer has yet fully convinced them that it is human. The **Lovelace test** (2.0) is a measure of the originality and creativity of an AI system, something they have been traditionally unable to accomplish. However, with the rise in large-scale language models such as ChatGPT, we have also seen several AI art creation tools such as DALL-E 2, Midjourney and NightCafé which may come close to meeting these criteria as they are trained on massive data sets of labelled images. **Activity**: Explore some of the AI tools in the resources. Discuss how each tool differs from and enhances human abilities.	https://scribblediffusion.com/ https://www.craiyon.com/ https://apps.apple.com/us/app/ai-music-generator-for-musiclm/id1671403947 https://labs.google/ https://bard.google.com/
	ETHICS AND TECHNOLOGY The main **ethical issues** with the creation and use of AI and robots include: privacy concerns with data sharing/sourcing, manipulation by power/money seeking people, opacity (how understandable the algorithms are by humans) and bias (due to learned information being based on human-made data sets and humans being prone to bias). **Technology ethicists** inform designers and engineers about the risks to humans psychologically from their products. Humans tend to have a fear that robots/AI will take over society and become dangerous to humans. This has been dramatized in science fiction; however, solutions to the problem have also been considered. The **three laws of robotics** were designed by science fiction writer Isaac Asimov in 1941. These are now used as guidelines to ensure the safety of humans and are followed by robotics engineers. 1. A robot may not injure a human being or, through inaction, allow a human being to come to harm. 2. A robot must obey the orders given to it by human beings except where such orders would conflict with the First Law. 3. A robot must protect its own existence as long as such protection does not conflict with the First or Second Laws. Autonomous vehicles require human-like ethical decision-making abilities such as who should be prioritised in the event of a collision. The **Moral Machine** is one example of how human data collection can aid this process. There has already been a history of bias in AI use. Examples include COMPAS, an AI risk assessment tool used by judges in the US tending to jail African American defendants more often than Caucasian Americans. This was due to the data set of past cases it had been trained on. Technology companies are aiming to use mathematical analysis such as 'impact assessments' to create a fairer system. There have also been criticisms of the use of female gendered assistive AIs such as Siri and Alexa. Sexist use of robots is also a concern in the sex robot industry where there is a fear that a lack of empathy towards robots could be generalised to human women encouraging violent behaviours towards them.	https://www.youtube.com/watch?v=kloNp7AAz0U https://www.moralmachine.net/ https://hai.stanford.edu/news/designing-ethical-self-driving-cars https://www.technologyreview.com/2019/10/17/75285/ai-fairer-than-judge-criminal-risk-assessment-algorithm/ https://www.ft.com/content/26372287-6fb3-457b-9e9c-f722027f36b3
	ROBOTICS AND ANDROIDS **Robopsychology** is the study of human-robot interactions as well as the ways in which psychology can be used to develop robots with artificial intelligence. This is a very new field of study in psychology but will have increasing growth in coming years as robots become more prevalent in our lives. Humans will need to interact with robots in order for them to make our lives easier. This means that robots will need to interpret human interactions. **Human robot interactions (HRI)** is a growing field in cyberpsychology. **Social robots** are designed to work with humans. **Androids** are more human-like, whereas others are created to be completely machine looking.	https://www.xplainableai.org/socialrobotics/ https://www.youtube.com/watch?v=O1ZhWv84eWE https://www.simplypsychology.org/uncanny-valley.html

	Humans design robots and choose which elements of movement, language and physical features they have. While robots can be taught low-level cognitive processes through algorithms, their lack of high-level functioning limits their ability to interact in a humanoid manner. Psychologists work with engineers to enable robots to recognise and respond appropriately to human emotions and perceive social cues. **Activity:** Use SHE to investigate the ways in which robotics, neuroscience and psychology influence and collaborate with each other to build psychological knowledge about HRI. Discuss how developments in technology impact the directions of psychological research. Humans have interesting responses to robots, including the fear of those that look more like humans. This relates to psychology as we can perceive the differences between humans and human-like robots extremely well, this is called the '**uncanny valley**' phenomenon. This is likely due to our evolutionary abilities to recognise human patterns of behaviour and issues with these. Robots can be used in the following ways: industrial manufacturing, medical aids, rehabilitation, companionship, social skill training, education, autonomous vehicles, space exploration and agriculture. The general aim is to extend the abilities of humans and provide more efficient ways to complete tasks without the need for humans.	https://www.youtube.com/watch?v=2STTNYNF4lk https://www.youtube.com/watch?v=zJHyaD1psMc https://www.youtube.com/watch?v=LzBUm31Vn3k

Short Answer Questions



1. How does social media use impact people's impression management and self-esteem?
2. When Nixon hears the 'ding' of a notification on his smartphone he feels excitement. Explain this response using a type of conditioning.
3. Xian is disappointed when she doesn't get as many 'likes' on her social media post as she did on yesterday's post. Explain this response using psychological concepts.
4. When Max plays Minecraft, he experiences a reward every time he 'mines' a block. Explain using psychological terms why Max wants to return to that area to break more blocks.
5. Describe how social media can facilitate positive experiences between people.
6. Explain using psychological terms why it is difficult to change other people's opinions online.
7. Explain the advantages and disadvantages of telehealth or e-therapy.
8. Describe three ways in which online behaviour differs from face-to-face interactions.

Extended Answer Questions

1. Complete a deconstruct and design using one of the questions below.

To what extent do online interactions improve the wellbeing of older people?

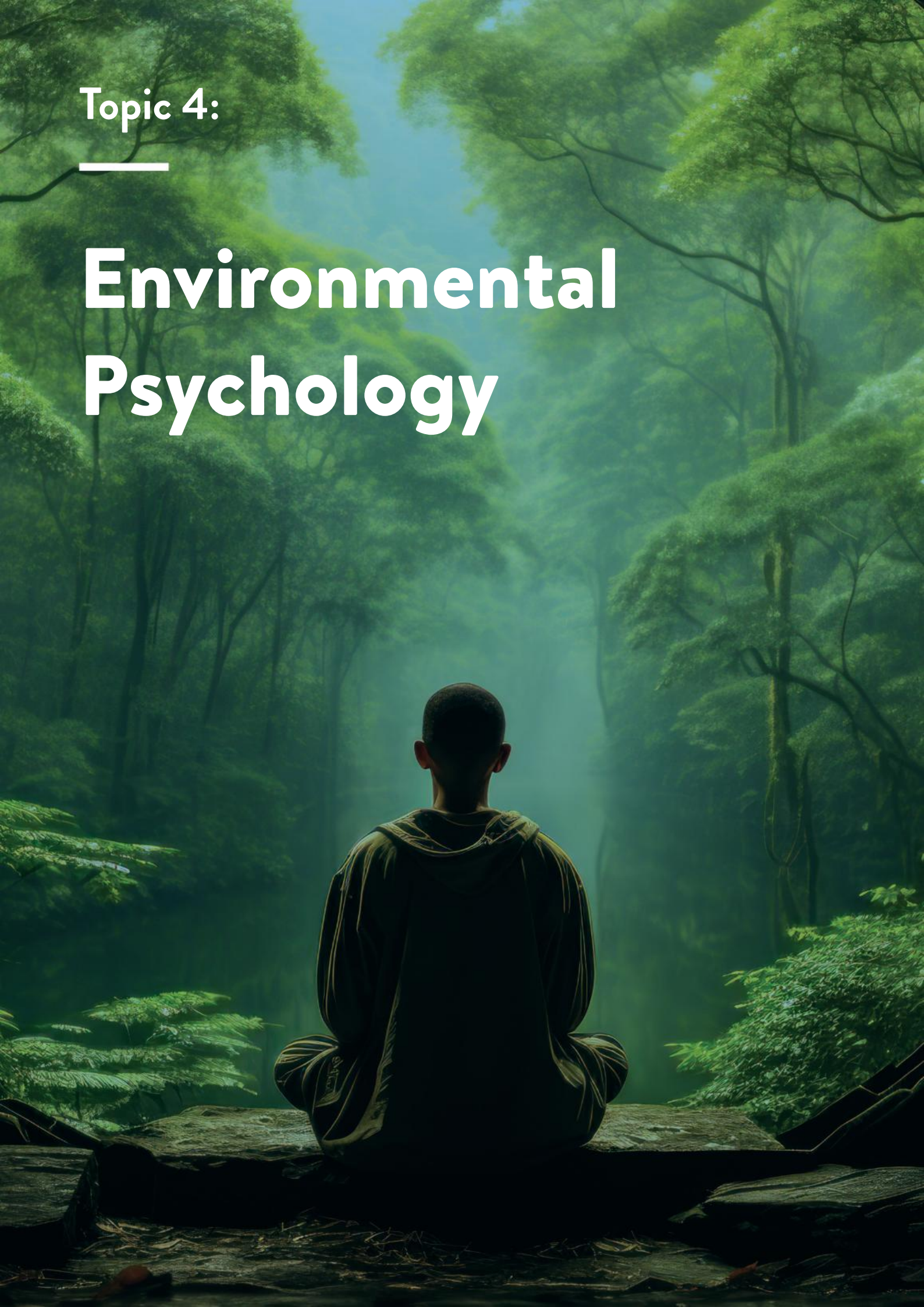
OR

To what extent does screen time impact sleep onset time in teenagers?

2. Use the biopsychosocial model to identify ways in which limiting screen time could impact children.

Topic 4:

Environmental Psychology



Introduction

The study of environmental psychology began in the mid-20th century and has recently had a resurgence due to more interest from designers and architects. While the more scientific approaches began from those designing public and medical facilities, we have now seen growth in workplace and school design as wellbeing of users has become a primary concern. There is also a contemporary trend to include biophilic and natural elements in design and architecture due to the psychological studies into their aesthetic and restorative properties. Unfortunately, there is not yet a crossover field of psychology and architecture, but we are rapidly approaching that juncture.

One of the main complexities of studying environments is their subjective nature in that all people interpret their perceptions through their own lens of previous experiences. Many aspects of physical space design have been quantified such as personal space and neighbourhood distances, but there is a need for rating scales when it comes to the aesthetic aspects. Similarly, there are physiological responses to environments that can be measured but emotions and moods often require qualitative means of explanation.

TEACHER ADVICE:

The content in this topic should be tailored to the assessment tasks you have chosen. These could include design tasks, analysis of spaces, further research into an aspect of a design and comparisons of spaces. The topic lends itself to Deconstruct and Design Investigations that focus on one element of the environment such as sound, temperature, lighting, colours, furniture layout, etc. Learning could be aimed towards how these elements impact different desired states or moods.

	TOPIC CONTENT	RESOURCES
W1	**Connection to country**	
	Aboriginal history and connection with land as the longest continuous culture in the world is very deeply felt and important for all to learn from. **Activity:** Ask an elder to speak with the class about the importance of their connection to country.	https://tv.apple.com/au/movie/connection-to-country/umc.cmc.2g74c88tz8h88gkbh4en-scwjb https://www.youtube.com/watch?v=DAGBVE3V4s0
	Mental health of Aboriginal people and the importance of loss of connection to their land, culture and people. *possible link to Indigenous Psychology **Activity:** What is a place of significance to you? Share with the class your reasons why.	https://www.telethonkids.org.au/globalassets/media/documents/aboriginal-health/working-together-second-edition/working-together-aboriginal-and-wellbeing-2014.pdf
	Aboriginal land management uses traditional techniques to sustainably care for the ecosystem. Aboriginal people are increasingly being given the chance to care for the land as park rangers.	https://www.youtube.com/watch?v=OdP4p1z1_JA https://www.creativespirits.info/aboriginalculture/land/land-management-improves-health
W2	**Nature and Us**	
	Biophilia is a hypothetical human tendency to interact or be closely associated with other forms of life in nature. This makes sense as all healthy ecosystems rely on close relationships between their organisms.	https://www.frontiersin.org/articles/10.3389/fpsyg.2021.700709/full
	The **Savannah theory** in Evolutionary psychology supports the idea that our survival as a species depended on our ability to find fertile land, cultivate food and nurture new life. The natural environment would have shaped our behaviours as well as our biological traits. **Activity:** In what ways are humans shaped to their natural environment? Which are biological and which are behavioural?	https://wildspacesinstitute.org/blog/f/the-savannah-hypothesis
	Ecotherapy uses the theory that spending time in nature is restorative and can decrease mental health problems such as anxiety and depression. **Activity:** Explore how the aspects of ecotherapy fit into the Biopsychosocial model of health.	https://www.goodtherapy.org/learn-about-therapy/types/econature-therapy
	Natural sunlight can help alleviate seasonal affective disorder (SAD) through the winter months and helps the body to produce more vitamin D, which is important for healthy growth, the immune system, regulating insulin and can even affect gene expression of cancer. It can also help to regulate circadian rhythms by activating the suprachiasmatic nucleus in the brain and the release of melatonin when in darkness.	https://www.goodrx.com/health-topic/environmental/benefits-of-sunlight https://www.tropicresponses.in/design-with-sunlight
	Since the Covid-19 pandemic, Australians are changing their exercise habits with fewer people relying on sporting clubs and more taking up walking (Ausplay 2022). **Activity:** Consider ways in which humans could maximise their exposure to natural spaces and sunlight. How could local governments and councils help people to spend more time in nature?	https://www.clearinghouseforsport.gov.au/participation-in-sport https://www.premier.sa.gov.au/media-releases/news-items/visitor-numbers-to-some-of-south-australias-most-iconic-national-parks-have-skyrocketed

W3	**Environment and Mood**	
	One component of emotional intelligence relates to being able to recognise our moods. The **Yale Emotional Intelligence Mood Meter** can help us to measure moods on a two-fold spectrum. This can be used in design elements. **Activity**: Choose design aspects that could encourage each quadrant of the Mood meter in a home/school/workplace.	https://vimeo.com/98375367?embedded=true&source=vimeo_logo&owner=28329610 https://www.thehopefullinstitute.com/mood-meter/
	Mehrabian and Russel in 1974 developed the **PAD Scale of Emotional State** which used three semantic differential scales: Dominance (control/privacy), Pleasure and Arousal to measure people's emotional responses to environments. **Activity**: (SIS) Devise your own scale for people's emotional reactions to environments. Collect data on two different spaces and compare the responses.	https://en.wikipedia.org/wiki/PAD_emotional_state_model.
	Environment and Behaviour	
	Plutchik's Psychoevolutionary Theory of Emotions (1980) can be applied to the survival needs of humans and how these elicit certain emotions. These can be applied to environments and design of spaces to either encourage or discourage certain survival behaviours. *possible link to Emotion topic	https://dragonscanbebeaten.files.wordpress.com/2010/06/robert-plutchiks-psychoevolutionary-theory-of-basic-emotions-poster.pdf
	Prospect-refuge theory (Appleton, 1975) states that we are more likely to enjoy environments that provide us with views of opportunities (prospects) while we are also protected (refuge). Again, this is linked to evolutionary theory and the need for protection and food in order to survive. **Activity**: Analyse a space in your local area or school (such as a playground) for the prospects and refuges it provides. Can the space be improved to offer more places that satisfy these needs?	https://everything2.com/title/Prospect-refuge+theory https://medium.com/@social_archi/prospect-refuge-theory-ca5d80379e51
	Place identity was initially introduced by Proshansky (1978), who defined place identity as "those dimensions of self that define the individual's **personal identity** in relation to the **physical environment** by means of a complex pattern of conscious and unconscious ideas, feelings, values, goals, preferences, skills, and behavioral tendencies relevant to a specific environment" **Activity**: Draw or describe aspects of your bedroom that were chosen by you and reflect your identity.	https://www.frontiersin.org/articles/10.3389/fpsyg.2020.00294/full
W4	**Environment and Stress**	
	Environmental stressors include excessive noise, heat/cold, smells, overcrowding, air pollution, lack of space, threatening stimuli, etc. These can have detrimental effects on human wellbeing if not managed well. **Activity**: Analyse the SHE concepts shown in the article linked here. https://www.bbc.com/future/article/20170605-the-psychology-behind-your-citys-design	
	Attention Restoration Theory by Kaplan and Kaplan in 1989 stated that humans find restorative power by being in natural settings to combat mental fatigue and stress. These spaces should offer the following aspects. 1. **Fascination**- a sense of awe 2. **Being away**- removal from worries 3. **Extension**- connection between elements as you move through the environment 4. **Compatibility**- the space's relevance to the person **Activity**: Find aspects of the school yard, classroom or hallways that elicit these responses. Design new elements if some are missing or could be enhanced.	https://positivepsychology.com/attention-restoration-theory/ https://www.frontiersin.org/articles/10.3389/fpsyg.2018.00773/full

W5	**Architectural Design using psychological theory**	
	Stephen Kaplan also proposed that environments that encourage optimal human functioning are also those that we find aesthetically pleasing. They proposed that these optimal environments have the following four elements. 1. **Coherence/Unity**: the sense that things in the environment work well together. 2. **Legibility**: the assumption that a person can navigate the environment without getting lost. 3. **Complexity**: the amount of information and diversity in an environment that make it worth learning about. 4. **Mystery**: the expectation of being able to acquire more information about an environment. **Activity:** apply these concepts to a house/bedroom/workplace design.	https://www.fs.usda.gov/psw/publications/documents/psw_gtr035/psw_gtr035_05_s-kaplan.pdf
	Psychology is increasingly being used to inform architecture, especially for public spaces. The following **elements of design** should be considered for people using the space: • temperature • sound • light • tactile experiences • sensory experiences • colours • furniture placement • density/privacy **Deconstruct & Design Investigation ideas:** Investigate the effects of one of these aspects in different spaces within the school environment on either cognition, learning or emotion/mood.	Psychology in Architectural Design | SXSW 2021
	Wayfinding refers to people's ability to navigate a space easily. This means that signage is important when people are entering a new space and need to find their route through the area. Several design decisions can also help such as lighting and flooring choices that direct people or delineate spaces as separate.	https://cgdarch.com/wayfinding-in-architecture/
	Biophilic design takes its ideas from this theory and uses elements such as natural colours, patterns, materials, sounds, etc. when planning human occupied buildings.	https://living-future.org.au/biophilia/ https://living-future.org.au/biophilic-design/
	Other possible areas of exploration	
	WORKPLACE DESIGN This could link well to organisation psychology as the main aims are to increase productivity and wellbeing. Consider how the design elements learned about can be used to improve a workplace. People choosing to work from home and increasing technology reliance are changing the nature of workplace environments.	https://www.theceomagazine.com/business/management-leadership/inclusive-workplace-design/ https://www.pwc.com.au/future-of-work-design-for-the-future/designing-a-hybrid-office.html
	HOUSING DESIGN Consider how the design elements learned about can be used to improve a living environment. Many studies have found that the quality of housing directly affects quality of life. Examples of poor social housing include the Ponte City Apartments in Johannesburg in 1975, which had a donut ring shape to the tall building and became unsafe in the 1980s as the core was filled with rubbish and debris up to 5 storeys high. Housing affects people's emotional state and the behaviour of occupants so it is important that those who have no choice in the design of their houses are well looked after by those who are designing government housing.	https://architectnews.com/psychology-in-architecture-home-that-complements-your-personality/ https://aifs.gov.au/resources/policy-and-practice-papers/housing-stress-and-mental-health-and-wellbeing-families

	LEARNING SPACE DESIGN Consider how the design elements learned about can be used to improve a learning environment. Education research is increasingly turning towards using play as a form or learning. Nature play uses takes this idea further and incorporates using the natural world to help children connect with their environment and foster a healthy respect for sustaining it. With increasing use of technology in classrooms, challenges face educational professionals in how to foster social and environmental connections between learners. Elements of indoor and outdoor space design can assist in this aim.	https://www.educause.edu/research-and-publications/books/learning-spaces/chapter-6-psychology-learning-environments https://natureplaysa.org.au/educators/educators-resource-hub/lesson-plans/ Websites for a **SHE Task on school design guides.** https://www.planning.nsw.gov.au/government-architect-nsw/design-guidance/design-guide-for-schools https://research.unimelb.edu.au/strengths/updates/impact/designing-better-learning-environments https://architectureau.com/articles/learning-environments-designing-space-for-every-body/ https://www.arc.gov.au/news-publications/media/making-difference-publication/designing-classrooms-match-21st-century-teaching https://commercial.velux.com/blog/learning-environments/the-6-vital-design-elements-of-school-design https://www.vertisbuildings.com/blog/how-to-create-an-effective-learning-environment
	VIRTUAL ENVIRONMENTS More and more of our time is spent in digital environments as we use technology in our work lives as well as our home lives. Virtual worlds can be used as an extension of our own environments by using augmented reality and virtual reality. *possible link to Cyberpsychology Research into how we respond to virtual environments and how these can be harnessed to help us improve wellbeing is advancing. Virtual worlds can elicit emotional responses and behaviours in similar ways that physical environments do. They also offer cost-effective ways to research environmental psychology without having to travel to a location.	https://www.frontiersin.org/articles/10.3389/fpsyg.2017.02321/full. https://www.frontiersin.org/articles/10.3389/frvir.2021.603750/full
	PSYCHOLOGY OF CLIMATE CHANGE AND SUSTAINABILITY There is a growing body of research looking not only at the physical impacts of climate change on humans (climate refugees, adaptation to the environment) but also on the psychological impacts experienced by people due to a lack of political action to reduce human impacts on climate change. Climate change affects some groups of society more than others and requires behaviour and attitude change from those in positions of power to reduce these effects.	https://psychology.org.au/getmedia/cf076d33-4470-415d-8acc-75f375adf2f3/coping_with_climate_change.pdf.pdf https://psychology.org.au/getmedia/88ee1716-2604-44ce-b87a-ca0408dfaa12/climate-change-empowerment-handbook.pdf

	HOSPITAL DESIGN Consider how the design elements learned about can be used to improve a healing environment. Research into how spaces could impact wellbeing began by looking into hospital and medical recovery environments in the field of medical sociology. Salutogenesis is the study of health that focuses on factors that support wellbeing. For example, views of nature from hospital windows have been found to decrease recovery time. Modern hospital designs such as the Royal Adelaide Hospital use many salutogenic principles.	https://www.indesignlive.com/people/bates-smarts-mark-healey-healthcare-design https://www.designinc.com.au/project/royal-adelaide-hospital
	PRISON DESIGN Consider how the design elements learned about can be used to improve a prison environment. Historically prisons have aimed to demoralise and sedate their prisoners with an emphasis on control of inmates. Modern prison designs aim to rehabilitate by encouraging wellbeing and reducing psychological distress. This is largely due to psychological research and a growing understanding that prisoners deserve respect in order to change their behaviours and be rehabilitated back into society. Prison designs have changed accordingly, see the examples provided in the resources.	https://issuu.com/natasha.majalap/docs/literature_review https://www.aihw.gov.au/reports/australias-health/health-of-prisoners Good design example: https://www.mossop.com.au/yatala-labour-prison-redvelopment Bad design example: https://ethics.org.au/ethics-explainer-panopticon-what-is-the-panopticon-effect/

Short Answer Questions

1. Use one psychological theory to explain why people like to be around nature.
2. Give two reasons for how spending time in natural light (sunshine) can promote wellbeing and health.
3. Use the theory of place identity to explain the connection Aboriginal people have with the land.
4. Describe one method that could be used to gather self-report data about the aesthetic appeal of views from a window.
5. Design an experiment into the effect of indoor plants on wellbeing.
6. Imagine you are sitting in the middle of a busy intersection in a city. Describe the environmental stressors you would be experiencing.
7. Explain how aspects of your homework environment could be used to help you maintain focus and attention.
8. Use a room such as the interior of 'Central Perk' from the TV show Friends and analyse it using the four elements of optimal environments.

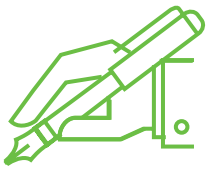
Extended Answer Questions

1. Discuss how interior design and architecture can help solve social problems such as wayfinding for people with disabilities.
2. Brainstorm ways in which a local primary school looking to increase nature play could influence how students spend their break times by changing the environment around them.

Topic 5:

Forensic Psychology

Editor's Notes



In making the decision to teach Forensic Psychology, it is important to be aware and cautious of some of the ethical issues that may arise during your lessons. Forensic Psychology is a fascinating field of study that many students approach with excitement and interest – however, they may find some content triggering or engage in their own research, which may reveal information beyond what would be suitable to discuss in the classroom. Therefore, teaching Forensic Psychology demands a responsible approach to ensure the ethical treatment of sensitive subjects. Your role as an educator is to foster a deep understanding of Forensic Psychology while also instilling a sense of responsibility and ethics in your students.

Avoid sensationalism: It is inevitable that there are current movies, television shows or documentaries popular at the time you are teaching the unit, that have the potential to sensationalise the crime, at the expense of the victim and their family. Be aware of the 'glamourisation' of criminal behaviour or the creation of stereotypes. Encourage students to focus on understanding the psychological factors behind criminal actions without perpetuating stigma or fear.

Psychological Wellbeing: Be mindful of the potential impact that studying criminal behaviour may have on students' psychological wellbeing. Some topics may be distressing or trigger emotional responses. Create a safe and supportive learning environment where students feel comfortable discussing their thoughts and concerns. Provide appropriate resources for anyone who may require additional support.

Cultural Sensitivity: Recognise the diversity of cultural perspectives on crime and punishment. Avoid generalisations or assumptions based on cultural backgrounds. Encourage critical thinking and open discussions that consider the influence of cultural factors on criminal behaviour, aligned to the biopsychosocial model.

Professional Boundaries: Maintain professional boundaries when discussing forensic psychology topics. It is essential to guide students in analysing behaviour objectively rather than engaging in personal judgments or speculation. Remind students that they are not qualified to diagnose or assess individuals based solely on their knowledge from the unit.

	TOPIC CONTENT	RESOURCES
W1	**Introduction and the Biopsycho-social Model – Biological Focus**	
	Introduction to the discipline of Forensic Psychology Differences between forensic psychology and criminology The role of the forensic psychologist Job availability and University courses in South Australia	https://www.psychology.org/careers/what-is-forensic-psychology/ The job of a forensic psychologist: https://www.youtube.com/watch?v=nPhLEalLR8k Forensic psychologist in court during Johnny Depp trial: https://www.youtube.com/watch?v=YNpEelus_tY Forensic Psychology course trailer for university: https://www.youtube.com/watch?v=vS4tbZ39_lo SATAC undergraduate course search: https://www.satac.edu.au/undergraduate-apply-login
	A **Criminal Profile** is a tool used by law enforcement agencies to create a description of an unknown criminal or suspect based on evidence and behavioural analysis. A Criminal Profile typically involves the analysis of crime scene details, victimology, witness accounts, and any available forensic evidence. Profilers use this information to develop a psychological and behavioural profile of the offender, which may include aspects such as age range, gender, occupation, level of education, and potential personality traits.	Criminal Profiling Introduction: https://www.youtube.com/watch?v=q54p4HF70-w&t=4s Criminal Profiling Methods: https://www.youtube.com/watch?v=63VYN-bytzWs&t=129s Criminal Profiling Online activity: https://www.quia.com/cm/598644.html Criminal Profiling Task Criminal Characteristics exercise: https://criminalcharacters.com/resources/teaching-resources/offender-match-up/ Criminal Profiling activity ideas: https://digital.films.com/HTTP/180652.pdf Research Task: https://www.bremertonschools.org/cms/lib/WA01001541/Centricity/Domain/222/Catching%20Killers%20Criminal%20Profilers%20viewing%20Qs%201415.pdf Criminal Profiling Worksheet: https://studylib.net/doc/8315803/offender-profiling-worksheet A serial killer profiler explains the minds of murderers: https://www.youtube.com/watch?v=JbHg6U5DL0w
	The **Biopsychosocial Model** can be used to consider the biological, psychological and social influences on criminal behaviour. **Biological Influences** include head trauma, the Warrior Gene, drug use, and brain abnormalities.	The Biopsychosocial Model Video: https://www.youtube.com/watch?v=NrFj4OI-60yU&t=9s Sentencing Remarks: https://www.courts.sa.gov.au/court-decisions/sentencing-remarks/ (see notes 1) The story of Sef Gonzales: https://www.dailymotion.com/video/x59x8nj (see notes 2) Travis Runnels Worksheet Genes and Criminal Behaviour: https://www.youtube.com/watch?v=p41ROy-4qDXA Factors Affecting Criminal Behaviour: https://www.youtube.com/watch?v=Aq9jG-dA2Tgk The connection between brain injuries and crime: https://www.youtube.com/watch?v=Aq9jGdA2Tgk Aaron Hernandez and CTE: https://www.youtube.com/watch?v=Aq9jGdA2Tgk (see notes 3) Methamphetamine use in Australia: https://www.youtube.com/watch?v=Hbk3lGx4sK8 Links between crime and methamphetamine use: https://www.aic.gov.au/publications/tandi/tandi516 The Warrior Gene: https://www.youtube.com/watch?v=4osmQ7jWiow&list=PLDneXs5uFb9dVOn90o9roYe5RNzDPiZcW&index=3 National Geographic – Born to Rage: https://www.dailymotion.com/video/x5jawo1 What causes crime? https://www.bocsar.nsw.gov.au/Publications/CJB/cjb54.pdf Theories of Crime: http://www.sccjr.ac.uk/wp-content/uploads/2016/02/SCCJR-Causes-of-Crime.pdf

W2	**The Biopsychosocial Model – Social Focus**	
	The **Biopsychosocial Model** can be used to consider the biological, psychological and social influences on criminal behaviour. **Social Influences** include peer pressure, gang affiliation, religious beliefs, relationships, poverty, inequality, issues with authority, revenge, family and education.	60 Minutes – Chicago's Gang War: https://www.youtube.com/watch?v=Y1YUiTR-REF0 Louis Theroux: Law and Disorder in Johannesburg (available on Clickview or Stan) The influence of peer pressure on crime: https://www.iosrjournals.org/iosr-jhss/papers/Vol.%2021%20Issue1/Version-3/B021130814.pdf The postcode wars: https://www.youtube.com/watch?v=nQcqdBwAjR0 How the justice system is rigged against the poor: https://www.youtube.com/watch?v=Ry5jTjBhZpA Economic adversity and crime: https://www.aic.gov.au/sites/default/files/2020-05/tandi040.pdf
	Bowlby's Theory of Maternal Deprivation suggests that mental health and behavioural problems can be attributed to early childhood. **Three parts to Bowlby's theory:** 1. A child has an innate ability to form an attachment to the caregiver, usually the mother. 2. The child should receive continuous care from this person for the first two years of life. 3. If this does not occur, consequences may be delinquency, aggression, depression or psychopathy.	Attachment Theory: How childhood affects life: https://www.youtube.com/watch?v=WjOowWxOXCg&t=284s Science Bulletins: Attachment Theory: https://www.youtube.com/watch?v=kwxj-fuPlArY Attachment workbook: https://budmouth.academies.aspirationsacademies.org/wp-content/uploads/sites/4/2020/06/Attachment-Workbook.pdf
W3	**The Biopsychosocial Model - Psychological Focus**	
	The **Biopsychosocial Model** can be used to consider the biological, psychological and social influences on criminal behaviour. **Psychological Influences** include personality, personal beliefs, past experiences, attitudes, mental health, intelligence, coping and resilience and cognition. **Gottfredson's Self Control theory of crime** suggests that the single most influential factor behind why crimes are committed is a lack of self-control. **Kohlberg's Cognitive Theory** states that individuals pass through stages of moral development: Preconventional, Conventional and Post Conventional stages.	The marshmallow experiment: https://www.youtube.com/watch?v=Yo4WF3cSd-9Q&t=9s Kohlberg's Theory summary: http://www.suttonclassroom.com/uploads/9/0/6/0/9060273/lawrence_kohlberg_chart.pdf Kohlberg's Theory worksheet: https://www.apa.org/ed/precollege/topss/teaching-resources/kohlberg.pdf What is your stage of Moral Development Quiz: https://www.playbuzz.com/toddsi10/what-is-your-stage-of-moral-development Heinz' Moral Dilemma: https://courses.lumenlearning.com/wm-lifespandevelopment/chapter/kohlbergs-stages-of-moral-development/ Heinz Moral Dilemma video: https://www.youtube.com/watch?v=ALE5H9Byms0 Children respond to Heinz Moral Dilemma: https://www.youtube.com/watch?v=C-jPfI4Xu2CU Crimes ranked by IQ (for fun!): https://www.youtube.com/watch?v=TZ92c7hg-8E

	Oppositional Defiance Disorder in children may develop into **conduct disorders** which have a correlation with criminal activity in adulthood. **Freud's Psychodynamic Theory** theorises that we have three forces acting on our personality: The Id, the Ego and the Superego. The Id drives us to experience pleasure. The Superego provides moral standards that influence our behaviour. It is the role of the Ego to balance these two forces. Freud theorised that criminal behaviour comes from having an over-active Id, with an under-active Super Ego. **Eysenck's Personality Theory** identifies two antisocial personality traits: (1) extraversion and (2) neuroticism. Eysenck suggested that individuals who score at the ends of either domain of extraversion and neuroticism are more likely to be self-destructive and criminal. **The Big 5 Personality Theory** measures five personality traits: Openness to Experience, Conscientiousness, Extraversion, Agreeableness and Neuroticism.	Oppositional Defiance Disorder: https://www.aacap.org/App_Themes/AACAP/docs/resource_centers/odd/odd_resource_center_odd_guide.pdf Conduct Disorder and Adult Criminality: http://www.personalityresearch.org/papers/panko.html#:~:text=Children%20with%20childhood%20or%20adolescence,a%20life%20of%20criminal%20activity. Conduct Disorder Information Sheet: https://childsafety.losangelescriminallawyer.pro/conduct-disorders.html Conduct disorders in children: https://www.youtube.com/watch?v=EUCIKfNINYU Child with conduct disorder on Dr Phil: https://www.youtube.com/watch?v=-JrJ-sk2h6Yo Freud's Psychodynamic Theory: https://www.youtube.com/watch?v=7vFf5CS27-Y Id, Ego and Superego: https://www.youtube.com/watch?v=KOCt_-0EO5Y Id, Ego, Superego quiz (just for fun!): https://rumandmonkey.com/widgets/toys/testgen/6023 Online Eysenck Personality test: https://psytests.org/eysenck/epqRen-run.html Eysenck's revised Psychoticism scale: https://pbarrett.net/publications/EPQR_1985_paper.pdf PEN Personality Test: https://www.idrlabs.com/pen-personality/test.php Eysenck's Theory of Criminal Personality: http://psychlotron.org.uk/newResources/criminological/A2_AQB_crim_EysenckTheory.pdf Eysenck's Personality Theory: https://www.youtube.com/watch?v=fHWa8_ubNR4 The Big 5 Personality Test: https://www.outofservice.com/bigfive/ The Self-Peer Big 5 Personality Test: The Self-Peer Personality Test (personalitylab.org)
W4	**Psychopathy, Antisocial Personality Disorder and the Dark Triad**	
	Psychopathy is not a mental health issue. It is a symptom of a personality disorder. It features antisocial behaviour, a lack of empathy and remorse and a lack of inhibition. **Criminals with a Psychopathic Personality:** Experience low levels of fear and feelings of invincibility, have an inability to control their impulses and use cruelty to gain control. There have been links determined between Psychopathy and criminal activity, imprisonment, and substance abuse. **The Diagnostic and Statistical Manual of Mental Disorders** (DSM) is a manual compiled by American Psychiatrists that lists the symptoms and criteria of all mental health issues.	Information Sheet – What is Psychopathy? https://psychopathyis.org/what-is-psychopathy/ Psychopathy – an overview: https://www.psychologytoday.com/au/basics/psychopathy Research Paper – Psychopathy and Crime: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4059069/ Understanding psychopathic criminals: https://www.psychologytoday.com/au/blog/wicked-deeds/201605/understanding-psychopathic-criminals Sociopathy vs Psychopathy: https://www.youtube.com/watch?v=IHqv8fsWmJM Psychopathy TED talk: https://www.youtube.com/watch?v=OOLE9VsDqbE Psychopaths – can their brains be fixed? https://www.youtube.com/watch?v=_Cz7CjeVmKI Psychopaths can change: https://theconversation.com/psychopaths-can-feel-emotions-and-can-be-treated-dont-believe-what-you-see-on-crime-shows-181446 Discovering if I'm a Psychopath: https://www.youtube.com/watch?v=WB9FeGTi-5Uk Psychopaths – The Dark Triad personality types: https://www.youtube.com/watch?v=JR3u0k8Ozi8

	In the DSM-V Psychopathy is now referred to as '**Antisocial Personality Disorder**' Research suggests that the environment can contribute to an individual becoming Psychopathic. **The Macdonald Triad** is a set of three factors (bedwetting, fire-setting and animal cruelty) that has been suggested if all three or any combination of two, are present together, to be predictive of or associated with later violent tendencies, particularly with relation to serial offenses. **The Dark Triad consists of three personality traits: Narcissism, Psychopathy and Machiavellianism.** People scoring high on these traits are more likely to commit crimes and cause social distress. They also tend to be less compassionate, agreeable, empathetic, satisfied with their lives, and less likely to believe they and others are good.	Hare Psychopathy Checklist: https://psychology-tools.com/test/pcl-22 Psychopathy with Piers Morgan: https://www.youtube.com/watch?v=dUNFYy0_hN8 Antisocial Personality Disorder in the DSM: https://courses.lumenlearning.com/wm-abnormalpsych/chapter/antisocial-personality-disorder/ What is Antisocial Personality Disorder? https://www.youtube.com/watch?v=Nf-Ho-HJObU8 Psychopathy Worksheet Can the Macdonald Triad predict crime? https://www.healthline.com/health/macdonald-triad#the-3-signs The Macdonald Triad: Warning signs or misleading theory? https://www.youtube.com/watch?v=6BW9SAV_NSQ The Dark Triad explained: https://www.youtube.com/watch?v=Ws23W0fXBvA The Dark Triad: What is it? https://www.youtube.com/watch?v=kvJDkPKbaLE Insight: I'm a narcissist: https://www.youtube.com/watch?v=s4h7JaDOjjI Online Dark Triad test: https://openpsychometrics.org/tests/SD3/
W5	**Eyewitness Testimony and the Insanity Defence**	
	Eyewitness Testimony refers to an individual's account of an event or situation that they have personally witnessed. It is a form of evidence commonly used in legal proceedings, such as criminal trials, where individuals who were present at the scene of a crime or an incident provide their recollection of what they saw. Eyewitness testimony is often considered a powerful and compelling form of evidence, as it can provide firsthand information about the events under investigation. However, it is important to note that eyewitness testimony is not infallible. Examples of convictions based on incorrect eyewitness testimony: • Ronald Cotton • Central Park 5 • Thomas Haynesworth	Eyewitness Testimony: https://nobaproject.com/modules/eyewitness-testimony-and-memory-biases Are you a good eyewitness? https://www.americanbar.org/groups/public_education/publications/insights-on-law-and-society/volume-18/insights-issue-2---vol-18/lesson-three---are-you-a-good-eyewitness-/ Eyewitness Testimony investigation: https://www.sciencebuddies.org/science-fair-projects/project-ideas/HumBeh_p014/human-behavior/testing-accuracy-of-eyewitness-testimony Eyewitness Basics: https://sciencespot.net/Media/FrnsScience/eyewitnessbasics.ppt Types of Evidence: https://www.casdschools.org/site/handlers/filedownload.ashx?moduleinstanceid=7201&dataid=6177&FileName=02-TypesOfEvidence.pdf How reliable is eyewitness testimony? https://www.youtube.com/watch?v=ChgPk2OiZCw Can you spot the murderer? https://www.youtube.com/watch?v=v_QbTX2qS10 Flaws in eyewitness testimony: https://www.youtube.com/watch?v=97DSyF_Z3Do Dr Phil's Eyewitness Test: https://www.youtube.com/watch?v=XORIWLgEVwE The Innocence Project – Reevaluating Lineups: https://www.youtube.com/watch?v=DZsckuKiH94 Ronald Cotton: https://innocenceproject.org/cases/ronald-cotton/ Jennifer Thompson's TED talk: https://www.youtube.com/watch?v=tbCvExeNsVk Ronald Cotton and the misconceptions of memory: https://www.youtube.com/watch?v=Cwje3HWmprw One Night in Central Park: https://www.youtube.com/watch?v=Cwje3HWmprw The wrongful conviction of the Central Park 5: https://www.youtube.com/watch?v=8UepaMQV2Wo

	The following factors can influence the reliability of eyewitness testimony: • Memory Decay • Stress and Emotion • Weapon Focus • Leading Questions • Cross-Racial Identification • Cognitive Biases	Innocence Project: The Central Park 5: https://innocenceproject.org/tag/central-park-five/ Eyewitness Identification Reform: https://innocenceproject.org/policies/eyewitness-identification-reform-in-arkansas/ Thomas Haynesworth: https://innocenceproject.org/cases/thomas-haynesworth/ Are all of your memories real? https://www.youtube.com/watch?v=D-2p86FvqF4 Psychology and Eyewitness Testimony: https://www.simplypsychology.org/eyewitness-testimony.html How does Weapon Focus impact eyewitness testimony? https://www.sciencedirect.com/science/article/pii/S2211368116300699 Weapon Focus effect: https://www.youtube.com/watch?v=0E8USGvBqHE Questioning in Cross Examination: https://www.youtube.com/watch?v=Hi8oP-MZ--bU Own Race Bias: https://www.youtube.com/watch?v=IwDztyx-qSg&t=1s Confirmation Bias in Criminal Cases: https://www.miami-criminal-lawyer.net/blog/confirmation-bias-in-criminal-cases
	The insanity defence, also known as the mental disorder defence, is a legal strategy used by defendants in criminal cases to argue that they should not be held criminally responsible for their actions due to a mental illness or mental disorder. The defence is based on the premise that individuals who are unable to understand the nature or consequences of their actions or unable to distinguish right from wrong should not be held fully accountable for their criminal behaviour. There are generally several key elements involved in an insanity defence: • **Mental Disorder:** The defendant must prove that they had a diagnosable mental health disorder at the time of the offence. This may include bipolar disorder, schizophrenia, or severe depression. • **Lack of Capacity:** The defendant must show that, due to their mental disorder, they lacked the capacity to understand the nature and consequences of their actions. This means they were unable to appreciate the wrongfulness of their conduct. • **Causal Link:** The defendant must establish a causal link between their mental disorder and the criminal act. They must demonstrate that their mental disorder directly influenced or contributed to the commission of the crime.	Commonwealth Criminal Code: Mental Impairment: https://www.ag.gov.au/crime/publications/commonwealth-criminal-code-guide-practitioners-draft/part-23-circumstances-which-there-no-criminal-responsibility/division-7-circumstances-involving-lack-capacity/73-mental-impairment The insanity defence against murder: https://www.sydney.edu.au/news-opinion/news/2015/11/06/how-the-insanity-defence-against-a-murder-charge-works.html Mental Illness and Criminal Law: https://www.countycourt.vic.gov.au/files/documents/2018-08/factsheet-9-mental-illness-and-criminal-law.pdf and https://www.forensicare.vic.gov.au/about-us/mental-illness-and-the-criminal-law/ The Murray Deakin case: https://www.mondaq.com/australia/crime/1036768/man-found-not-guilty-of-murder-of-police-officer-and-grandmother-due-to-mental-illness The case of Cy Walsh: https://www.abc.net.au/news/2016-09-28/cy-walsh-found-not-guilty-due-to-mental-incompetence/7884062 Relevant Factors in sentencing: https://csd.njca.com.au/principles-practice/general_sentencing_principles/s16a_specific_relevant_factors/mental_illness_sentencing_factors/ How mental impairment could influence sentencing: https://www.sentencingcouncil.vic.gov.au/about-sentencing/mental-impairment-and-sentencing Aiden Fucci: https://www.youtube.com/watch?v=HMV47KEK2C0 What does it mean to be criminally insane? https://www.youtube.com/watch?v=UzGnD9sE0A4 I cared for serial killers and psychopaths: https://www.youtube.com/watch?v=-39j2TG9hAw Dunwoody Trial – The insanity defence: https://www.youtube.com/watch?v=h-0vdRmlPPcI

Suggestions for SHE Sources

Predicting criminal profiles from DNA: **https://www.afp.gov.au/news-media/media-releases/advanced-technology-allows-afp-predict-criminal-profiles-dna**

Is criminal profiling dead? **https://www.psychologytoday.com/au/blog/real-criminal-minds/201904/is-criminal-profiling-dead-should-it-be**

Should the Warrior Gene be a criminal defence? **https://www.washingtonpost.com/outlook/2021/03/18/genetics-criminal-defense-warrior-violence/**

The relationship between head injury and violent offending: **https://www.bocsar.nsw.gov.au/Publications/CJB/cjb107.pdf**

Global crime trends during Covid-19: **https://www.nature.com/articles/s41562-021-01151-3**

A healing approach to US gun violence: **https://www.nature.com/articles/s41599-021-00820-y**

Cybercrime in Australia: **https://www.aic.gov.au/publications/sr/sr43**

Can a gene for psychopathy be in your family? **https://www.psychologytoday.com/au/blog/surviving-the-female-psychopath/202204/can-gene-psychopathy-be-in-your-family**

Why do people commit arson? **https://theconversation.com/revenge-excitement-or-profit-why-do-people-commit-arson-206502**

The dependability of CCTV in murder investigations: **https://theconversation.com/the-camera-never-lies-our-research-found-cctv-isnt-always-dependable-when-it-comes-to-murder-investigations-199828**

How your brainwaves may be used in criminal trials: **https://theconversation.com/how-your-brainwaves-could-be-used-in-criminal-trials-182970**

Why men are more likely to commit crime: **https://theconversation.com/men-are-more-likely-to-commit-violent-crimes-why-is-this-so-and-how-do-we-change-it-157331**

Why do young people join gangs? **https://theconversation.com/why-do-young-people-join-gangs-members-explain-the-appeal-of-risk-taking-120844**

Stage 1 Psychology Assessment Cover Sheet – Criminal Profiling Task

Student Name:		**Village:**
Assessment Name	**Assessment Type**	**Weighting**
Criminal Psychology – Profile	Investigations Folio Science as a Human Endeavour (SHE) Task	25%

PURPOSE OF ASSESSMENT:

The focus of this task is to explore an aspect of the topic: ***Forensic Psychology*** with a particular emphasis on the interaction between society and the application of psychological knowledge. You will use and acknowledge a variety of relevant sources to find data and information to support your findings. Your research, findings and outcome will have a focus on ***two*** dot points of the key concepts of Science as a Human Endeavour listed below:

- **Development and Application**
  Developments in research, enterprise and technology lead to advancements in psychological *understanding.*
- **Influence and Impact**
  The use of psychological knowledge may impact through beneficial or unexpected consequences requiring monitoring, assessment, and evaluation of risk, through ethical considerations.

DESCRIPTION OF ASSESSMENT:

You will conduct a forensic analysis of an infamous murderer. You will need to choose a criminal from the list below. It does not matter if you have never heard of them, or if you know nothing about their crimes.

Criminal Name	Dates
Gary Ridgway	1982 -1998
Ted Bundy	1974 -1978
John Bunting	1992 -1999
Ivan Milat	1989 -1992
Aileen Wuornos	1989 -1990
Martin Bryant	1996
John Wayne Gacy	1968 - 1978
Anders Breivik	2011
David Berkowitz	1976 -1977
Katherine Knight	2000
Richard Ramirez	1984 -1985

Section One – Research the physical characteristics of the criminal you have chosen and use this information to fill out the **Suspect Information Form. INCLUDE A PHOTO of the criminal.**
Section Two – Pretend that you are the first officer on the scene of all murders conducted by the perpetrator. Using your research of the crime scenes, fill out the **Crime Scene Information Forms.** Explain if any vehicles were involved.
Section Three – Using your research of the victims of the criminal, fill in the **Victims Form.** You only need to report on a maximum of five victims. If there are any witnesses or people who testified in court, fill in the **Witnesses Form.**
Section Four – Complete the **Summary of the Crime**, addressing the criteria given.
Section Five – Complete the **Psychological Profile**, providing as much details as possible.
Section Six – Complete the **Crime and Punishment Form**, including the Resolution, Verdict and your **Suggested Penalty.**
Section Seven – Review the literature provided and discuss the **value** of Criminal Profiling in society.

SHE Forensic Psychology Performance Standards Assessed

	Investigation, Analysis and Evaluation	Knowledge and Application
A	Systematically analyses and interprets data and evidence to formulate logical conclusions with detailed justification.	Critically explores and understands in depth the interaction between science and society. Communicates knowledge and understanding of psychology coherently, with highly effective use of appropriate terms, conventions, and representations.
B	Logically analyses and interprets data and evidence to formulate suitable conclusions with reasonable justification.	Logically explores and understands in some depth the interaction between science and society. Communicates knowledge and understanding of psychology mostly coherently, with effective use of appropriate terms, conventions, and representations.
C	Undertakes some analysis and interpretation of data and evidence to formulate generally appropriate conclusions with some justification.	Explores and understands aspects of the interaction between science and society. Communicates knowledge and understanding of psychology generally effectively, using some appropriate terms, conventions, and representations.
D	Describes data and undertakes some basic interpretation to formulate a basic conclusion.	Partially explores and recognizes aspects of the interaction between science and society. Communicates basic psychological information, using some appropriate terms, conventions, and/or representations.
E	Attempts to describe results and/or interpret data to formulate a basic conclusion.	Attempts to explore and identify an aspect of the interaction between science and society. Attempts to communicate information about psychology

SECTION ONE – SUSPECT INFORMATION

Include (at minimum) a photograph of perpetrator (cite your source) and fill out the following information. You should be able to get most of the information from the picture and information online.

Suspect (Last, First, Middle, Nickname/s):			**Photograph:**	
Ethnicity:	**Sex:**	**Age at arrest:**	**DOB:**	**City/State of Residence:**
Height:	**Weight:**	**Build:**	**Eye Colour:**	**Hair Colour:**
Additional Identifiers (i.e., glasses, tattoos, teeth, birthmarks, jewellery, scars etc.):				
Suspect's clothing when arrested: (or in any photograph you can find)				

Hair length/ type:	**Hair Style:**	**Facial Hair:**	**Complexion:**	**General Appearance:**	**Demeanour at arrest:**

Select all that apply (highlight is fine). If choose 'other', provide description:					
· Unknown · Bald · Collar · Long · Neck · Short · Shoulder · Coarse · Fine · Thick · Thinning · Other:	· Unknown · Afro/nat. · Braided · Bushy · Greasy · Military · Ponytail · Processed · Straight · Wavy/curly · Wig · Other:	· Unknown · Clean shave · Full beard · Fu Manchu · Goatee · Lower lip · Moustache · Fuzz · Sideburns · Unshaven · Van Dyke · Other:	· Unknown · Acne · Dark · Freckled · Light · Medium · Pale · Pocked · Ruddy · Tanned · Other:	· Unknown · Casual · Dirty · Disguise · Flashy · Good-looking · Military · Unkempt · Unusual odour · Well groomed · Other:	· Unknow · Angry · Apologetic · Calm · Disorganized · Irrational · Nervous · Polite · Professional · Stupor · Other:

SECTION TWO – CRIME SCENE INFORMATION

Pretend that you are the first officer on the scene of all murders conducted by the perpetrator. Using your research of the crime scenes, fill out the **Crime Scene Information Forms.** Explain if any vehicles were involved.

SUSPECT ACTIONS **Select all you believe apply (highlight is fine). Look over ALL incidents**		
☐ Unknown ☐ Affiliated with gang or group. ☐ Drank on premises ☐ Blindfolded victim ☐ Bound victim ☐ Cased area ☐ Child molest ☐ Child neglect ☐ Child abuse ☐ Concealed goods ☐ Concealed evidence ☐ Defeated security ☐ Defecated ☐ Demanded cash/jewellery ☐ Disabled phone ☐ Domestic violence ☐ Fired weapon ☐ Forced entry ☐ Forced victim to lay on floor ☐ Forced victim to move ☐ Fraud/false pretence ☐ Hide/concealed on face/wore mask ☐ Hideout technique ☐ Injured victim ☐ Made threats ☐ Offered assistance	☐ Offered drugs ☐ Offered gambling ☐ Offered sex ☐ Offered sex acts ☐ Picked pocket ☐ Prepared exit ☐ Purse snatched ☐ Sexually assaulted victim ☐ Set fire ☐ Shoplifted ☐ Smoked on premises ☐ Stalked victim ☐ Tampered with vehicle ☐ Took animals ☐ Took cash from register personally ☐ Took only jewellery ☐ Took only money ☐ Took property from person ☐ Took property from vehicle ☐ Took victims vehicle ☐ Tortured victim ☐ Used demand note ☐ Intentionally left evidence/staged the crime scene for authorities	☐ Used left hand ☐ Used lockout ☐ Used matches ☐ Used phone ☐ Used right hand ☐ Used stolen vehicle ☐ Used threats ☐ Used victim's tool ☐ Vandalized ☐ Vehicle needed to remove property ☐ Victim died of injuries Other: Pretended to be:

EVIDENCE COLLECTED
Select all that apply (highlight is fine)

None Fingerprints Weapon/tools Vehicle Photos Hair Stains Blood/semen
Confession Eyewitness testimony Body or body parts Other (describe):

Disposition of evidence:
Good Partial Poor

Witnesses:
Yes No

Officer assault

- ☐ One-officer vehicle
- ☐ Two-officer vehicle
- ☐ Detective or special assignment
- ☐ Alone
- ☐ Assisted
- ☐ Number officers with personal injury:
- ☐ Number officers without personal injury:

Activity when assault occurred

- ☐ Fleeing scene
- ☐ Other arrest
- ☐ Civil order
- ☐ Transporting
- ☐ Traffic stop
- ☐ Pursuit
- ☐ Ambush
- ☐ Other:

EVIDENCE OF ARSON
Select all that apply (highlight is fine). If not applicable, select 'N/A'

N/A

- ☐ Single residential
- ☐ Other residential
- ☐ Storage
- ☐ Industrial/manufacturing
- ☐ Other commercial
- ☐ Community/public
- ☐ All other structures
- ☐ Motor vehicles
- ☐ Other mobile property
- ☐ Crops, timber, fences, signs etc.

Abandoned:
Yes No

WEAPONS/TOOLS/IMPLEMENTS USED
Select all that apply (highlight is fine).

- ☐ Physical force
- ☐ Tool
- ☐ Weapon
- ☐ N/A

How used? If checked more than one box, elaborate. Describe all weapons and/or tools used here.

VEHICLES **Select all that apply (highlight is fine). If not applicable, select 'N/A'**				
Suspect Vehicle: **N/A**	**Year:**	**Make:**	**Model:**	**Colour/s:**
Additional vehicle identifiers (damage, chrome wheels, stickers etc.)				

SECTION THREE – VICTIMS AND WITNESSES

Using your research of the victims of the criminal, fill in the **Victims Form.** You only need to report on a maximum of six victims. If there are any witnesses or people who testified in court, fill in the **Witnesses Form.**

	Victims Name (Last, Frist, Middle	Location of incident	Age	Relation to Suspect	Sex	Race (see code below)
VICTIMS						

Note: if your offender has more than 6 victims, you do not have to list them all. You can if you want, however you will need to add to the rows of the table above, and ensure you cite where you got the information from.

PRIMARY WITNESSES

WITNESSES
Include names of all witnesses. If there are no witnesses, select 'N/A'
N/A

Witnesses Name (Last, First, Middle)	State/City of Residence	Age	Relation to Suspect	Sex	Race (see code below)	Witness Type (Select below – highlight is fine)
						Arresting officer Other lay witnesses
						Arresting officer Other lay witnesses
						Arresting officer Other lay witnesses
						Arresting officer Other lay witnesses
						Arresting officer Other lay witnesses
						Arresting officer Other lay witnesses
						Arresting officer Other lay witnesses

Note: if there are more than 7 witnesses, you do not have to list them all. You can if you want, however you will need to add to the rows of the table above, and ensure you cite where you got the information from.

Race Code Legend:

A = Asian	H = Hispanic	P = Pacific Islander
B = Black	I = Indian	S = Samoan
C= Chinese	J = Japanese	U = Hawaiian
D = Cambodian	K = Korean	V = Vietnamize
F = Filipino	L = Laotian	W = White
G = Guamanian	O = Other	Z = Asian Indian

SECTION FOUR – SUMMARY OF THE CRIME

Complete the **Summary of the Crime**, addressing the criteria given.

Summarise the crime, addressing the following points:

- Did the criminal plan their crime? Was there any evidence of this? Explain the events that directly proceeded their crime. Did anything trigger this violence or aggression?
- If the criminal committed more than one crime, what were the differences and similarities between the crime scenes?
- Were there patterns in the victims/weapons used/accomplices?
- Explain what led to the arrest of the criminal. Why did they come under suspicion? Did they make any mistakes or leave any evidence behind at the crime scene that caused them to be arrested?

(Approximately 300 words)

SECTION FIVE – PSYCHOLOGICAL PROFILE

Complete the **Psychological Profile**, providing as much details as possible.

Provide a biography on the criminal

- What was their childhood like? Was there any history of abuse, delinquent behaviour, trauma or disorders?
- Describe the perpetrators personality. Did they suffer from any psychological disorders? What are the symptoms/characteristics of this disorder? What else could contribute to their thoughts and actions i.e., past history? Stressors? Medical conditions? Psychological conditions? Drug usage? Work life? Personal life and relationships?

Consider the Biopsychosocial Model here!

(Approximately 300 words)

SECTION SIX – CRIME AND PUNISHMENT

Complete the **Crime and Punishment Form**, including the Resolution, Verdict and your **Suggested Penalty.**

CATEGORIZATION. How would you categorize this person's actions and motivations for their behaviour? Select all that apply (highlight is fine). Do not add more if you can't support or argue why you selected your choice. You do not have to select an item from each box, but you might have more than one box selected in each section.

TYPOLOGY	**TYPOLOGY**
☐ Disorganised ☐ Organised	☐ Mass Murder ☐ Spree Killer ☐ Serial Killer

DEFINITIONS

Mass Murder: Killing a number of people within the same location over a short period of time.

Spree Killer: Killing two or more people across two or more locations.

Serial Killer: Killing more than three people in two or more separate events for psychological pleasure.

Rampager: Violent or reckless behaviour that is uncontrolled, unplanned and destructive.

ACTIONS (IN RELATION TO THE VICTIM)

☐ Domestic Abuse
☐ Child Abuse
☐ Family Homicide (killing of family)

MOTIVATIONS

SOCIAL INFLUENCE

☐ Conformity
☐ Roles
☐ Obedience
☐ Stress

☐ Battered Spouse Syndrome
☐ Crime of passion
☐ Child abuse

☐ Mental illness (e.g., Depression, Schizophrenia, Bipolar, Psychosis, PTSD, others?)
☐ Personality Disorder (e.g. Borderline, Antisocial, Narcissistic, others?)
☐ Organic Disorder (e.g., tumour, head trauma, others?)

HATE CRIME	**RAPIST**	**STALKER**	**SERIAL MURDER**
☐ Thrill ☐ Mission ☐ Retaliatory ☐ Defensive	☐ Anger ☐ Power ☐ Sadist ☐ Paedophilia	☐ Domestic ☐ Psychopathic ☐ Psychotic ☐ Simple Obsessional ☐ Erotomania	☐ Visionary ☐ Hedonistic ☐ Power ☐ Mission

OTHER

☐ Profit
☐ Self-defence
☐ Boredom
☐ Empathy for victim
☐ Any other motivations that are not listed here

VERDICT AND SENTENCING

- Explain how the case was closed and what the final verdict was.
- If you were the judge, what would your sentence be? Explain why you feel this appropriate, taking into consideration the number of crimes committed, the nature of the crime/s, the mental health of the perpetrator and the likelihood of reoffending.
- Select the offense from the table below you believe should be the most appropriate sentence
  (highlight is fine). (Approximately 200 words)

• First Degree	• Misdemeanour-manslaughter
• Second Degree	• Justifiable Homicide
• Felony Murder	• Excusable Homicide
• Voluntary Manslaughter	

SECTION SEVEN – CRIMINAL PSYCHOLOGY AS A HUMAN ENDEAVOUR

You now need to reflect on the value of the process of Criminal Profiling to society. In this task, you have been asked to prepare the profile ***after*** the perpetrator has been identified. However, Criminal Profiles are also used when the offender is not yet identified.

Review the literature provided and discuss the **value** of Criminal Profiling in society.

In the final section of this assignment, you are required to read and review the excerpts provided from the publication 'Criminal Profiling from Crime Scene Analysis.' **https://courseware.cutm.ac.in/wp-content/uploads/2022/01/criminal-profiling-from-crime-scene-analysis.pdf**

You should write approximately 200 words regarding why Criminal Profiling is a valuable aspect of crime solving.

Do not forget to include a full bibliography of all websites used to gather your information for this task. Make sure you include the full citations using Harvard referencing.

The following excerpts are taken from a publication entitled

Criminal Profiling from Crime Scene Analysis

It is authored by U.S. Department of Justice as part of the information on serial killers provided by the FBI's Training Division and Behavioural Science Unit at Quantico, Virginia.

INTRODUCTION: HISTORY OF CRIMINAL PROFILING

Criminal profiling has been used successfully by law enforcement in several areas and is a valued means by which to narrow the field of investigation. Profiling does not provide the specific identity of the offender. Rather, it indicates the kind of person most likely to have committed a crime by focusing on certain behavioural and personality characteristics.

Profiling techniques have been used in various settings, such as hostage taking (Reiser, 1982). Law enforcement officers need to learn as much as possible about the hostage taker in order to protect the lives of the hostages. In such cases, police are aided by verbal contact (although often limited) with the offender and possibly by access to his family and friends. They must be able to assess the subject in terms of what course of action he is likely to take and what his reactions to various stimuli might be.

Profiling has been used also in identifying anonymous letter writers (Casey-Owens, 1983) and persons who make written or spoken threats of violence (Miron & Douglas 1979). In cases of the latter, psycholinguistic techniques have been used to compose a "threat dictionary" whereby every word in a message is assigned by a computer, to a specific category. Words as they are used in the threat message are then compared with those words as they are used in ordinary speech or writing. The vocabulary usage in the message may yield "signature" words unique to the offender. In this way, police may not only be able to determine that several letters were written by the same individual, but also to learn about the background and psychology of the offender.

Rapists and arsonists also lend themselves to profiling techniques. Through careful interview of the rape victim about the rapist's behaviour, law enforcement personnel begin to build a profile of the offender (Hazelwood, 1983). The rationale behind this approach is that behaviour reflects personality, and by examining behaviour, the investigator may be able to determine what type of person is responsible for the offence. For example, common characteristics can aid the investigator in identifying possible suspects and in developing techniques and strategies for interviewing them. However, studies in this area have focused on specific categories of offenders and are not yet generalisable to all offenders.

Criminal profiling has been found to be of particular usefulness in crimes such as serial sexual homicides. These crimes create a great deal of fear because of their apparently random and motiveless nature and they are also given high publicity. Consequently, law

enforcement personnel are under great public pressure to apprehend the perpetrator as quickly as possible. At the same time, these crimes may be the most difficult to solve precisely because of their apparent randomness.

PSYCHOLOGICAL PROFILING

In 1957, the identification of George Metesky, the arsonist in New York City's Mad Bomber case (which spanned 16 years), was aided by psychiatrist-criminologist James A. Brussel's staccato-style profile:

"Look for a heavy man. Middle-aged. Foreign born. Roman Catholic. Single. Lives with a brother or sister. When you find him, chances are he'll be wearing a double-breasted suit. Buttoned."

Indeed, the portrait was extraordinary in that the only variation was that Metesky lived with two single sisters. Brussel, in a discussion about the psychiatrist acting as Sherlock Holmes, explains that a psychiatrist usually studies a person and makes some reasonable predictions about how that person may react to a specific situation and about what he or she may do in the future. What is done in profiling, according to Brussel, is to reverse this process. Instead, by studying an individual's deeds, one deduces what kind of a person the individual might be (Brussel, 1968).

The idea of constructing a verbal picture of a murderer using psychological terms is not new. In 1960, Palmer published results of a three-year study of 51 murderers who were serving sentences in New England. Palmer's "typical murderer" was 33 years old when he committed murder. Using a gun, this typical killer murdered a male stranger during an argument. He came from a low social class and achieved very little in terms of education or occupation. He had a well-meaning but maladjusted mother and he experienced physical abuse and psychological frustrations during his childhood.

Similarly, Rizzo (1982) studied 31 accused murderers during the course of routine referrals for psychiatric examination at a court clinic. His profile of the average murderer listed the offender as a 26-year-old male, who most likely knew his victim, with monetary gain the most probable motivation for the crime.

CRIMINAL PROFILING

Through the techniques used today, law enforcement seeks to do more than describe the typical murderer, if in fact there ever was such a person. Investigative profilers analyse information gathered from the crime scene for what it might reveal about the type of person who committed the crime.

Law enforcement has had some outstanding investigators; however, their skills, knowledge and thought processes have rarely been captured in the professional literature. These people were truly the experts of the law enforcement field, and their skills have been so admired that many fictional characters (Sergeant Cuff, Sherlock Homes, Hercule Poirot, Mike Hammer and Charlie Chan) have been modelled on them. Although

Lunde (1976) has stated that the murders of fiction bear no resemblance to the murders of reality, a connection between fictional detective techniques and modern criminal profiling methods may indeed exist. For example, it is attention to detail that is the hallmark of famous fictional detectives; the smallest item at a crime scene does not escape their attention. As stated by Sergeant Cuff in Wilkie Collin's The Moonstone, widely acknowledged as the first full-length detective study:

At one end of the inquiry there was a murder, and at the other end there was a spot of ink on a tablecloth that nobody could account for. In all my experience … I have never met with such a thing as a trifle yet.

However, unlike detective fiction, real cases are not solved by one tiny clue but the analysis of all clues and crime patterns.

Criminal profiling has been described as a collections of leads (Rossi, 1982), as an educated attempt to provide specific information about a certain type of suspect (Geberth, 1981), and as a biographical sketch of behavioural patterns, trends and tendencies (Vorpagel, 2981). Geberth (1981) has also described the profiling process as particularly useful when the criminal has demonstrated some form of psychopathy. As used by the FBI profilers, the criminal profile generating process is defined as a technique for identifying the major personality and behavioural characteristics of an individual based upon an analysis of the crimes he or she has committed. The profiler's skill is in recognising the crime scene dynamics that link various criminal personality types who commit similar crimes.

The process used by an investigative profiler in developing a criminal profile is quite similar to that used by clinicians to make a diagnosis and treatment plan: data are collected and assessed, the situation reconstructed, hypotheses formulated, a profile developed and tested, and the results reported back. Investigators traditionally have learned profiling through brainstorming, intuition and educated guesswork. Their expertise is the result of years of accumulated wisdom, extensive experience in the field and familiarity with a large number of cases.

A profiler brings to the investigation the ability to make hypothetical formulations based on his or her previous experience. A formulation is defined here as a concept that organises, explains or makes investigative sense out of information emerging from the crime scene data and from the investigator's experience in understanding criminal actions.

A basic premise of criminal profiling is that the way a person thinks (i.e., his or her patterns of thinking) directs the person's behaviour. Thus, when the investigative profiler analyses a crime scene and notes certain critical factors, he or she may be able to determine the motive and type of person who committed the crime.

ASSESSING THE PERPETRATOR'S PSYCHE

One basic method of characterising offenders from crime scene evidence divides them into the following three categories:

- **Organised offenders:** These criminals are more sophisticated in their approach, and their crimes show evidence of planning. These types tend to be of average or better intelligence, employed, and in active social relationships such as with spouses and families. Even though they're driven by their fantasies, they maintain enough control to avoid being impulsive. They prepare and even rehearse. They tend to target specific victims or types of victims and use control measures such as restraints to maintain victim compliance. They bring the tools they need to gain access to and control of the victim and avoid leaving behind evidence. As killers, they generally hide or dispose of the body and are likely to have a dumpsite already selected.
- **Disorganised offenders:** These criminals usually live alone or with a relative, possess lower-than-average intelligence, are unemployed or work at menial jobs, and often have mental illnesses. They act impulsively, or as if they have little control over their fantasy-driven needs. They rarely use ruses to gain the victim's confidence, but rather attack with sudden violence, overwhelming the victim. The crime scene often is messy and chaotic. This type of offender doesn't plan ahead or bring tools along, but rather uses whatever is handy. As killers, they typically leave the body at the scene and exert little effort to avoid leaving behind evidence. Some have sexual contact with the victim after killing him or her.
- **Mixed offenders:** Some offenders leave behind mixed messages at crime scenes. They show evidence of planning and a sophisticated MO, but the assault itself may be frenzied or messy, which may indicate some control over deep-seated and violent fantasies.

Profilers have developed categories of *descriptors,* or ways that they describe the types of individuals who commit the crimes. Some of the descriptors used in serial killer profiling are as follows:

- **Age:** Most serial killers are in their 20s or 30s.
- **Sex:** Almost all are male.
- **Race:** Most don't cross racial lines. That means, in general, White offenders kill Whites, while Black offenders kill Blacks.
- **Residency:** Organized offenders may be married, have a family, and be well liked by their friends. Disorganized offenders, because of their mental instability and immaturity, tend to live alone or with a family member.
- **Proximity:** The location of the perpetrator's home in relationship to the crime scene is important. Most kill close to home, a factor that is particularly true with the first few victims. The area close to home is a comfort zone. With experience, however, the killer may move his predatory boundaries farther and farther from home.

- **Social skills:** Killers who use a ruse to ensnare their victims, like Ted Bundy did, typically possess good social skills, whereas those who use a blitz-style attack are less comfortable with conversation.
- **Work and military histories:** Organized offenders more often have a stable work history and are more likely to have left any military service with an honourable discharge. Disorganized offenders often are quite simply too unstable to hold a job in the long term or to complete military service.
- **Educational level:** Organized offenders tend to have more schooling than their disorganized counterparts.

Using these descriptors, profilers can create a pretty good picture, or profile, of the type of person who likely committed the crime. This profile may help police home in on a specific suspect and may play an important role during the interrogation of suspects. Knowing the type of individual who'd commit a criminal act helps investigators design the right questions and leverage any pressure points during interrogation that snare suspects in a web of lies or even produce a confession.

Profiling also plays an important role in determining whether a crime scene is staged. *Staging* means changing the appearance of the scene so that it looks like the murder took place in a different manner and for a different reason. A classic example: the husband who kills his wife in a fit of anger, then empties drawers and closets, knocks over furniture, and breaks a door lock or window to make it appear as though a burglar committed the crime. When investigators discover that the wife was severely bludgeoned and stabbed 20 times, the light of suspicion falls on the husband. A burglar wouldn't engage in such overkill, preferring instead to kill and run. Overkill usually is personal, with anger as the common underlying drive.

TAKING TROPHIES AND SOUVENIRS

Many criminals take things from the crime scene. Money, jewels, electronic equipment, and other valuables that can be sold commonly are taken, as is incriminating evidence, such as the murder weapon or a used condom.

Taken from: **https://www.dummies.com/article/academics-the-arts/science/forensics/forensics-profiling-the-perpetrator-200077/**

Question: You have managed to gather the following information about a crime. Use it to compile a simple Criminal Profile by answering the questions.

The criminal was spotted on CCTV driving by the property in the days prior to the attack. He drove an expensive BMW with the number plates removed. He always wore a hood and sunglasses that concealed his own identity. The perpetrator knocked on the front door of the property immediately after the husband left for work. He was clearly aware of the woman's daily schedule from watching her on a daily basis. It is believed that he was able to convince the victim to allow him to enter the house for some reason. He took her by surprise in the kitchen and immediately choked her with a rope he had brought with him for that purpose. She lost consciousness and he bound her wrists and ankles with zip-ties. When she regained consciousness she began screaming, so he reached into his bag for a knife and stabbed her to death, inflicting three wounds to the upper chest. The CCTV was unable to capture much that would assist forensic officers; however, it does show light glinting off a ring on his left hand. The victim's home was located in Pooraka. The crime scene was left immaculate, without any DNA evidence being left behind. The body was found discarded at the Greenfields wetlands with her earrings missing. The victim was 24-year-old Vietnamese woman, Miah Nguyen.

Question	Answer	Reasoning
Was this an organised or disorganised crime?		
What age range do you suspect the criminal is in?		
What do you predict the gender of the criminal to be?		
What do you predict the ethnicity of the criminal to be?		
In which area do you predict the criminal lives?		
Do you think the killer possesses good social skills?		
What can you predict about his work history?		
What is the likely relationship status of the killer?		
What can you assume about the educational level of this killer?		
Was the crime scene staged?		
Did the criminal engage in 'overkill' when murdering Miah?		
Would you assume that the criminal takes 'trophies' from his crime scenes?		

Criminal Psychology Written Test

Name

SECTION 1 – MULTIPLE CHOICE

1. **Which of the following is NOT something a Forensic Psychologist would do?**
   a) Evaluate the mental capacity of criminals.
   b) Determine if criminals are legally competent.
   c) Decide whether a criminal should receive the death penalty or not.
   d) Psychologically evaluate defendants using standardised tests.

2. **There has been evidence that serial killers have a smaller prefrontal cortex (an area of the brain). Which aspect of the biopsychosocial model could be used to describe the impact of this finding?**
   a) Biological.
   b) Cultural.
   c) Psychological.
   d) Social.

3. **What does a polygraph actually record?**
   a) Physiological responses including heart rate and blood pressure.
   b) Facial expressions associated with lying.
   c) Truthful responses.
   d) Lying.

4. **Which of the following attempts to explain criminal behaviour using the psychological aspect of the biopsychosocial model?**
   a) The role of testosterone within the body.
   b) The criteria for antisocial personality disorder as listed in the DSM.
   c) Past experiences, particularly those related to childhood.
   d) Religious practices.

5. **Which of the following is NOT a symptom of Psychopathy?**
   a) Empathy.
   b) Aggression.
   c) A lack of remorse.
   d) A desire for control.

6. **What is the name of the gene that is linked to aggression and violence?**
   a) The 'fighter' gene.
   b) The 'warrior' gene.
   c) The 'soldier' gene.
   d) The 'combat' gene.

7. Which of the following is NOT true about the DSM.

a) It is used to assist practitioners in diagnosing patients with mental health issues.
b) It lists the symptoms and criteria of mental health disorders.
c) It is used across the entire world, including Asia and the Middle East.
d) It is regularly updated; the current version is the DSM-V.

8. The theorist who suggested that a lack of relationship with the mother is a key contributor to potential criminal activity was

a) Bowlby.
b) Ekman.
c) Freud.
d) Gottfredson.

TRUE OR FALSE?

9. Micro expressions can be analysed to determine one's true emotions. TRUE FALSE

10. Gottfredson proposed the Self Control Theory of Crime. TRUE FALSE

11. The parent who a child usually forms the strongest attachment to is the Father. TRUE FALSE

SECTION TWO – SHORT ANSWER RESPONSE

1.

a. Explain what the term 'Criminal Profiling' means and give an example of a factor that may be considered when profiling.

.. ..

2.

a. Which psychologist presented the 'Theory of Maternal Deprivation?'

1 mark

b. Describe two aspects of the Theory of Maternal Deprivation that may lead to an increased likelihood of criminality.

2 marks

c. Discuss one personality trait that may either <u>increase</u> or <u>decrease</u> the likelihood of an individual engaging in criminal behaviour.

2 marks

3.

a. State three characteristics of Psychopaths (Antisocial Personality Disorder) as listed in the DSM-V.

3 marks

b. State two factors that may contribute to the likelihood of criminal behaviour using the social aspect of the biopsychosocial model.

2 marks

4. Explain what the DSM is and what it is used for.

2 marks

5. What is eyewitness testimony?

2 marks

6. Explain one reason why eyewitness testimony may not be reliable as evidence in court.

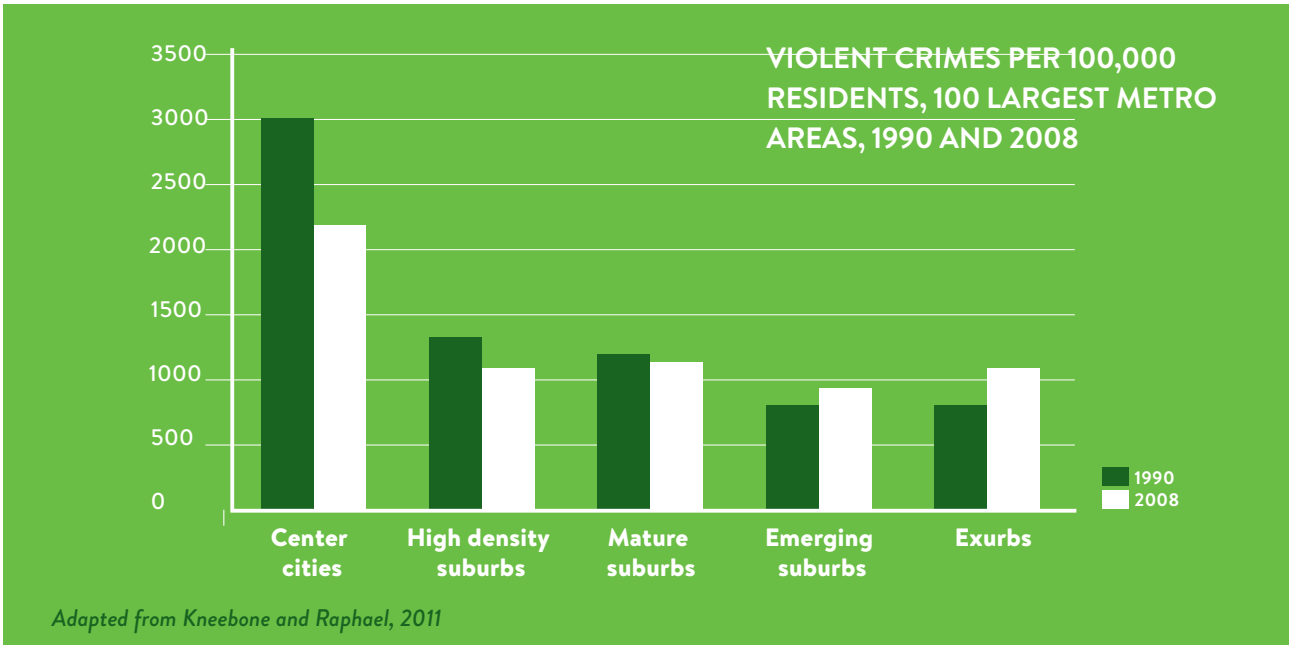
3 marks

7. State one consideration a judge would make when deciding upon a sentence or penalty for a Psychopath.

1 mark

SECTION THREE – COMPLEX REASONING AND EXTENDED RESPONSE

8. Consider the graph below:



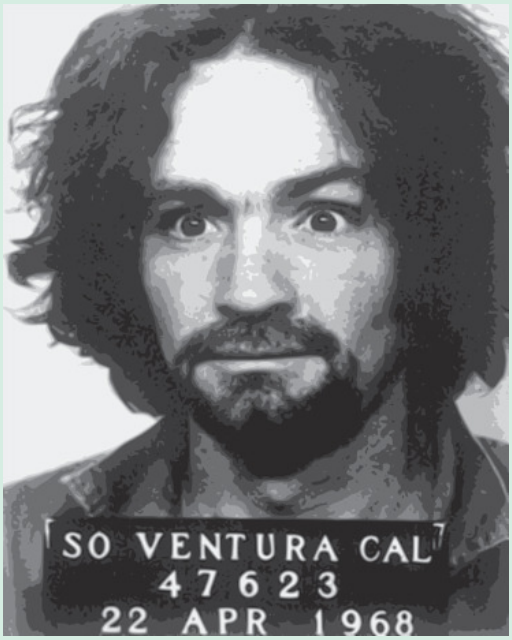
Adapted from Kneebone and Raphael, 2011

a. Describe the trend shown for the violent crimes committed in City Centres, High-Density Suburbs and Mature Suburbs between 1990 and 2008.

1 mark

b. Give one suggestion why crime has decreased so significantly in City Centres over this eighteen year period.

1 mark



9.

Charles Manson is a convicted serial killer. In the 1960s, Manson founded a hippie cult known as 'The Family' whom he manipulated into brutally killing others on his behalf. He enjoyed this feeling of control over the members of the cult.

Charles Manson was born in Cincinnati, Ohio to 16-year-old Kathleen Maddox. Kathleen had run away from home at the age of 15 and spent the next few decades drinking too much, with periods of time spent in jail. Since his mother couldn't take care of him, Charles spent his youth at the homes of various relatives and often at special reform schools and boys homes. By age nine, Charles Manson had already started stealing and soon added burglary and stealing cars to his repertoire.

Charles Manson was good at manipulating people. He took pieces from various religions to form his own philosophy. When the Beatles released their *White Album* in 1968, Manson believed their song "Helter Skelter" predicted an upcoming race war. "Helter skelter," Manson believed, was going to occur in the summer of 1969 when blacks were going to rise up and slaughter all the white people. He told his followers that they would be saved because they would go underground, literally, by traveling to an underground city of gold located in Death Valley. He enjoyed the control that he had over the cult members.

However, when the Armageddon that Manson had predicted did not occur, he said he and his followers must show the blacks how to do it.

Manson told four of his followers to go to 10050 Cielo Drive in Los Angeles and kill the people inside. This house once belonged to Terry Melcher, the man who had not helped Manson with his music career. However, Melcher no longer lived there; actress Sharon Tate and her husband, director Roman Polanski, had rented the house. On August 9, 1969, four of Manson's followers brutally murdered Tate, her unborn baby, and four others who were visiting her (Polanski was in Europe for work). The following night, Manson's followers brutally killed Leno and Rosemary LaBianca in their home. Manson demonstrated no empathy for the victims, either at the time, or during the court case that followed.

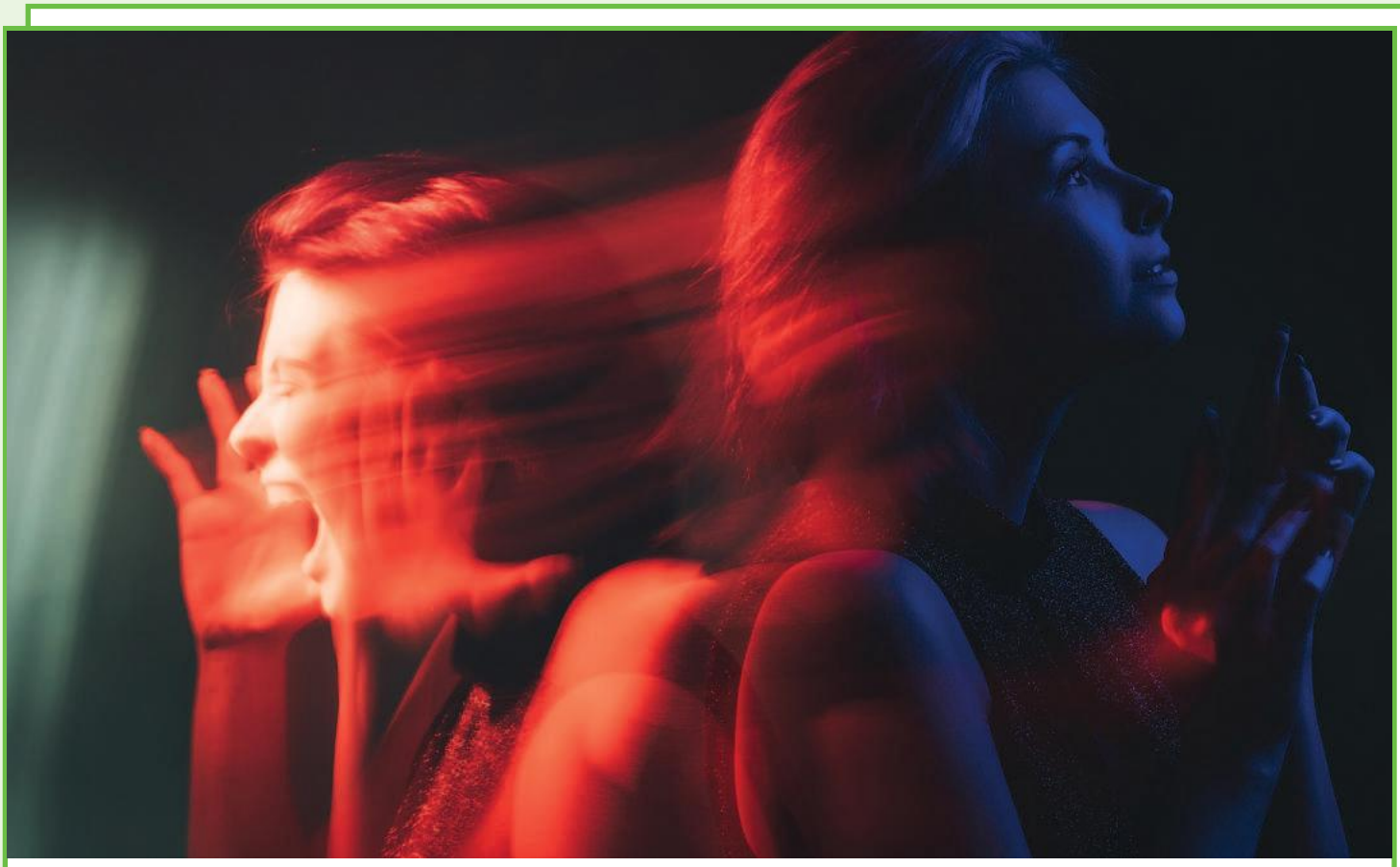
a. State two criteria that suggest that Manson may have been diagnosed with antisocial personality disorder.

b. State two psychological factors that may have contributed to Manson's criminality.

c. State two social factors that influenced Manson and the way he ran his cult.

d. Suggest a biological reason that may have contributed to Manson being an aggressive psychopath.

8 marks



The Profile: feelings and relationships

By Dr. Robert D. Hare

THE PSYCHOPATHY CHECKLIST

It is important that we diagnose Psychopaths correctly and do not place this label on people who are, instead, social deviants or criminals. Some Psychopaths do not break the law, and many people who break the law are not Psychopaths.

To achieve proper diagnosis, there are some emotional and interpersonal traits of this complex personality disorder that must be considered.

Emotional/Interpersonal

- glib and superficial
- egocentric and grandiose
- lack of remorse or guilt
- lack of empathy
- deceitful and manipulative
- shallow emotions

Social Deviance

- impulsive
- poor behaviour controls
- need for excitement
- lack of responsibility
- early behaviour problems
- adult antisocial behaviour

GLIB AND SUPERFICIAL

Psychopaths are often witty and articulate. They can be amusing and entertaining conversationalists, ready with a quick and clever comeback, and can tell unlikely but convincing stories that cast themselves in a good light. They can be very effective in presenting themselves well and are often very likable and charming. To some people, however, they seem too slick and smooth, too obviously insincere and superficial. Astute observers often get the impression that psychopaths are play-acting, mechanically “reading their lines.”

Psychopaths may ramble and tell stories that seem unlikely in light of what is known about them. Typically, they attempt to appear familiar with sociology, psychiatry, medicine, psychology, philosophy, poetry, literature, art, or law. A signpost to this trait is often a smooth lack of concern at being found out. One of our prison files describes a psychopathic inmate claiming to have advanced degrees in sociology and psychology, when in fact he did not even complete high school. He maintained the fiction during an interview with one of my students, a Ph.D. candidate in psychology; she commented that the inmate was so confident in his use of technical jargon and concepts that those not familiar with the field of psychology might well have been impressed. Variations on this sort of "expert" theme are common among psychopaths.

EGOCENTRIC AND GRANDIOSE

Psychopaths have a narcissistic and grossly inflated view of their self-worth and importance, a truly astounding egocentricity and sense of entitlement, and see themselves as the centre of the universe, as superior beings who are justified in living according to their own rules. "It's not that I don't follow the law," said one of our subjects. "I follow my own laws. I never violate my own rules." She then described these rules in terms of "looking out for number one."

Psychopaths often come across as arrogant, shameless braggarts -- self-assured, opinionated, domineering, and cocky. They love to have power and control over others and seem unable to believe that other people have valid opinions different from theirs. They appear charismatic or "electrifying" to some people.

Psychopaths are seldom embarrassed about their legal, financial, or personal problems. Rather, they see them as temporary setbacks, the results of bad luck, unfaithful friends, or an unfair and incompetent system.

A LACK OF REMORSE OR GUILT

Psychopaths show a stunning lack of concern for the devastating effects their actions have on others. Often they are completely forthright about the matter, calmly stating that they have no sense of guilt, are not sorry for the pain and destruction they have caused, and that there is no reason for them to be concerned.

Psychopaths' lack of remorse or guilt is associated with a remarkable ability to rationalize their behaviour and to shrug off personal responsibility for actions that cause shock and disappointment to family, friends, associates, and others who have played by the rules. Usually they have handy excuses for their behaviour, and in some cases they deny that it happened at all.

LACK OF EMPATHY

Many of the characteristics displayed by psychopaths -- especially their egocentricity, lack of remorse, shallow emotions, and deceitfulness are closely associated with a profound lack of empathy (an inability to construct a mental and emotional "facsimile" of another person). They seem unable to "get into the skin" or to "walk in the shoes" of others, except in a purely intellectual sense. The feelings of other people are of no concern to psychopaths.

Psychopaths view people as little more than objects to be used for their own gratification. The weak and the vulnerable -- whom they mock, rather than pity--are Favorite targets. "There is no such thing, in the psychopathic universe, as the merely weak," wrote psychologist Robert Rieber. "Whoever is weak is also a sucker; that is, someone who demands to be exploited...."[2]

DECEITFUL AND MANIPULATIVE

Lying, deceiving, and manipulation are natural talents for psychopaths.

With their powers of imagination in gear and focused on themselves, psychopaths appear amazingly unfazed by the possibility -- or even by the certainty -- of being found out. When caught in a lie or challenged with the truth, they are seldom perplexed or embarrassed -- they simply change their stories or attempt to rework the facts so that they appear to be consistent with the lie.

Psychopaths seem proud of their ability to lie. When asked if she lied easily, one woman with a high score on the Psychopathy Checklist laughed and replied, "I'm the best. I'm really good at it, I think because I sometimes admit to something bad about myself.

SHALLOW EMOTIONS

"I'm the most cold-blooded son of a bitch that you'll ever meet."[4] So Ted Bundy described himself to the police following his final arrest.

Psychopaths seem to suffer a kind of emotional poverty that limits the range and depth of their feelings. While at times they appear cold and unemotional, they are prone to dramatic, shallow, and short-lived displays of feeling. Careful observers are left with the impression that they are play-acting and that little is going on below the surface.

1. What does the article focus on?
2. What does it mean to be glib and superficial?
3. What does it mean to be egocentric and grandiose?
4. What does it mean to have shallow emotions?

The Biopsychosocial Model – Sef Gonzales

Sef Gonzales (born 16 September 1980) is a Filipino Australian who was convicted and sentenced in the Supreme Court of New South Wales to life imprisonment for the July 2001 murder of his father Teodoro "Teddy" Gonzales, aged 46 years, his mother Mary Loiva Gonzales, aged 43 years, and his sister Clodine Gonzales, aged 18 years, in Sydney, Australia.

When Sef only ten years old, he was trapped in the rubble of a building when it collapsed after an earthquake. He sustained serious head injuries but recovered.

The family appeared to be close-knit: the parents, however, were devout Catholics who, as 'tiger parents', had high hopes and strict expectations for their children. In particular, they had hoped their son would perform well academically, give up his musical and singing aspirations, and embark on a career in medicine or law. After attending Parramatta Marist High School, Gonzales studied medical science at the University of New South Wales but withdrew after two years. He then enrolled in law at Macquarie University. Performing poorly in his courses and at risk of expulsion, Gonzales tried to cover up his failure by falsifying his grades. When this was revealed by his sister to his parents, they threatened to withdraw certain privileges such as the use of his prized car, a green Ford Festiva. Gonzales also argued with his mother over a girlfriend of whom she disapproved, and his family threatened to disinherit him. This, along with Gonzales's desire to inherit the family's assets, were later established by police as motives for killing his family.

On 10 July 2001, at about 4:00 p.m., Gonzales left the family's law firm, where he worked part-time, and headed to the family home. Around 4:30 pm, armed with a baseball bat from his car and with two kitchen knives from a knife block in the kitchen, he entered Clodine›s bedroom and assaulted her while she was studying. There he compressed her neck while trying to strangle her, struck her head with the bat at least six times, and then stabbed her multiple times with the smaller of the knives. The cause of Clodine's death was a combination of the compression of her neck, blunt force head injuries, and abdominal stab wounds. Gonzales then waited until Loiva arrived home about 5:30 p.m. After entering the house, Gonzales attacked her with one of the kitchen knives in the living/dining room. Gonzales inflicted multiple stab wounds and cuts to her face, neck, chest, and abdomen.

At the funeral of his family, many attendees noticed that Sef did not appear as sad as they expected. When convicted, Sef did not express remorse for his crimes.

Biological Factors	
Psychological Factors	
Social Factors	

BIOPSYCHOSOCIAL MODEL WORKSHEET

Travis Runnels displays many traits that indicate antisocial personality disorder. He also experienced a significantly difficult upbringing, the influence of other criminals and some biological factors that may have impacted his decision to murder a prison guard. You can watch his story here: **https://www.youtube.com/watch?v=XOns_fwD8uA&t=259s**

Decide which aspect of the Biopsychosocial model best describes each of the following facts or statements about Travis's life, personality and beliefs.

	BIOLOGICAL	PSYCHOLOGICAL	SOCIAL
	Factors that impact the brain, nervous system and internal biology.	Traits or similarities seen in all psychopathic killers or sufferers of A.P.D, personality traits or past experiences that impact behaviour.	The impact of relationships with others, society and culture on behaviour.
Travis Runnels enjoys the thrill of breaking the law.			
His anger and resentment swell out of control.			
Travis is an outspoken malcontent (a person who is rebellious)			
Travis is very angry and has a chip on his shoulder			
Travis' mother, sister and grandmother have died. He has no contact with his father.			
His parents divorced before he was born, so he lived with his mother.			
It was hard living with his mother, because she was poor and the family was poor.			
He lived in 'The Ghetto' in South Dallas, a run-down, drug infested neighbourhood.			
Alcohol and Drug Use was part of every-day life for Travis.			
His mother and her brothers would frequently engage in fist fighting.			
Travis had a cousin, Joel, who he was very close to, who lived in a better neighbourhood.			

Travis's mother berated her children and encouraged them to be aggressive.			
Travis was aggressive because he needed to be on the streets.			
Travis did not form lasting friendships in his youth because he moved around so much.			
Travis has inherited genes from his aggressive mother.			
Travis never seemed concerned about getting in trouble.			
Travis was very popular and likeable. He was a leader. He was a jokester and played pranks.			
Travis often tortured and abused animals.			
Travis did not experience the usual physiological traits of fear before committing a crime.			
He did not feel any empathy.			
Travis has a low resting heart rate.			
The admiration of the other criminals made Travis feel powerful and superior.			
Travis displays the traits of a narcissist – a huge ego, an inflated sense of power and a sense of grandiosity.			
Travis felt as though he wasn't going to get caught – so the consequences were irrelevant.			
Travis was infuriated and bitter towards the prison system for his 70-year sentence.			
Travis knew from his childhood that the weak get stomped on – he wasn't about to let that happen to him.			
Travis felt lost, without direction in life, and on the verge of self-destruction.			
Travis's high levels of frustration led to aggression.			
Travis's plan to attack Wiley the guard was calculated and cold-blooded.			

Topic 6:

Exercise and Sports Psychology

Exercise and Sport Psychology investigates the psychological antecedents and consequences of physical activity behaviour. This includes: (a) understanding factors that predispose individuals to avoid or engage in physical activity (e.g., motivation, individual differences); (b) understanding how engagement in physical activity influences an individual's general well-being (e.g., self-esteem, mental health) throughout the lifespan; and (c) the application of psychological principles to improve athletic well-being and performance (APA Division 47). In such endeavours, the study of Exercise and Sport Psychology intertwines concepts, theories, and knowledge across a wide variety of scientific disciplines (e.g., Sport and Exercise Science, Psychology, Sociology, Neuroscience, Physical Science, and Health Science).

Option 1:

WEEK	LESSON OVERVIEW/TOPICS	SUGGESTED RESOURCES
1	What is Sport and Exercise Psychology? Approaches to Studying Exercise Psychology affective, biological, cognitive, personality, sociological	https://kinesiologybooks.org/index.php/stork/catalog/view/10/1/168-1 This resource can cover the suggested course outline.
2	Physical Activity Motivation Theories Intrinsic vs. Extrinsic Motivation: Understanding different types of motivation and how they impact athletes' performance.	See Table 1 Podcast on motivation states for physical activity and sedentarism https://www.scipod.global/dr-matthew-stults-kolehmainen-measuring-our-motivation-for-physical-activity-and-sedentary-behaviour/
3	Self-Determination Theory: Exploring the Self-Determination Theory and its relevance to sports participation and achievement. Goal Setting: Understanding the significance of setting clear and achievable goals in sports and practical exercises to develop effective goal-setting skills.	https://selfdeterminationtheory.org/SDT/documents/2006_SprayWangBiddleChat_EJSS%20(1).pdf https://balanceisbetter.org.nz/self-determination-theory-what-is-it-and-what-does-it-mean-practically-for-coaches/#:~:text=In%20Summary&text=In%20a%20coaching%20context%2C%20it,motivated%20to%20participate%20and%20learn. https://kids.frontiersin.org/articles/10.3389/frym.2022.684422 https://www.tandfonline.com/toc/uasp20/0/0 https://www.researchgate.net/publication/327199457_Goal_Setting_in_Sport_and_Performance
4	Psychological Skills Training & Sport Psychology Arousal regulation, stress- Burnout & Overtraining	https://www.youtube.com/watch?v=fQKwl85lOTs https://www.tandfonline.com/doi/full/10.1080/1612197X.2023.2168725#:~:text=Psychological%20skills%20training%20(PST)%20is,%2C%20or%20overview%2C%20is%20warranted. https://www.worldsupporter.org/en/chapter/76608-foundations-sport-and-exercise-psychology-weinberg (chapter 21)
5	Applied Sports Psychology: Examining real-life applications of sports psychology in areas like team dynamics, injury recovery, and sports rehabilitation.	https://www.youtube.com/watch?v=exGI_aFJnec https://musculoskeletalkey.com/psychosocial-factors-in-sports-injury-rehabilitation-and-return-to-play/ https://www.hrpub.org/download/20230430/SAJ29-19930512.pdf

TABLE 1:

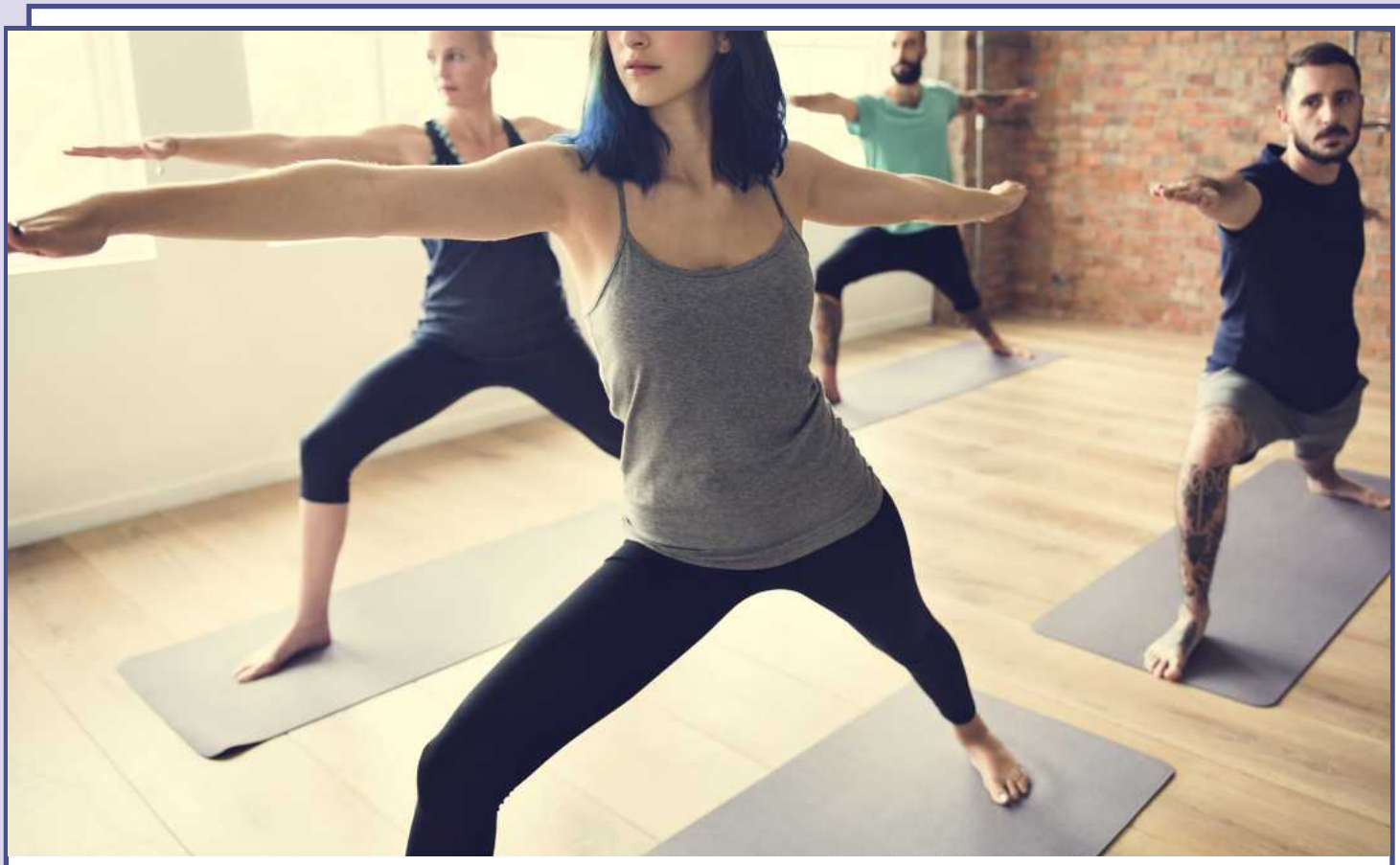
Overview of the Categories of Theories and Examples of Specific Theories as Applied to Physical Activity Motivation

CATEGORY AND ASSUMPTIONS	EXAMPLE THEORIES
Social cognitive theories: Behaviour is motivated by intentions/goals, which are based on expectancies and values about the behaviour	Health Action Process Approach (Schwazer, 1992, 2008, 2016) Temporal Self-Regulation Theory (Deci & Ryan, 1980, 2002)
Humanistic theories: Behaviour is motivated by two different types of processes: reflective processes that are deliberate and reasoned, and automatic processes that are spontaneous and uncontrollable.	Hedonic Motivation Theory (Williams, 2018; Williams & Bohlen, 2019) Theory of Effort Minimisation in Physical Activity (Cheval & Boisgointer, in press) Affective-Reflective Theory (see Chapter 4' Brand & Ekkekakis, 2021)
Maintenance theories: Motivation to initiate a change in behaviour is distinct from motivation to maintain behaviour change.	Theoretical Explanations for Maintenance of Behaviour Change

Option 2:

WEEK	LESSON OVERVIEW/TOPICS	SUGGESTED RESOURCES
1	Introduction to sport and exercise psychology What is it? Sport and Personality	https://www.worldsupporter.org/en/chapter/76608-foundations-sport-and-exercise-psychology-weinberg Chapters 1 and 2
2	Psychological well-being and exercise Addictive and unhealthy behaviours	https://www.sciencedirect.com/science/article/abs/pii/S0091743599905972 https://www.youtube.com/watch?v=Sdk7pLpblls
3	Group and team dynamics: • Theories of group development • Norms • Team climate	https://hr.mit.edu/learning-topics/teams/articles/stages-development (Tuckman) https://kinesiologybooks.org/index.php/stork/catalog/download/10/1/193-1?inline=1 https://www.youtube.com/watch?v=pyTuFHh8cZE
4	Goal setting and optimal performance	https://www.youtube.com/watch?v=Y7J-Wvrl4DM

Please note that a third subject outline option can be implimented by selecting topics across option 1 and 2 based on student/teacher interests.



Potential SHE resources

Mental skills coaches help athletes train the most important muscle - the mind.
https://globalsportmatters.com/health/2019/09/17/mental-skills-coaches-helping-athletes-train-the-most-important-muscle-the-mind/

Adaption to Psychological Stress in Sport
https://www.frontiersin.org/articles/10.3389/fpsyg.2020.02199/full

Motivational self-talk mitigates the harmful impact of mental fatigue on endurance performance.
https://www.tandfonline.com/doi/full/10.1080/10413200.2023.2208643

Deconstruct & Design

- Investigate methods to reduce psychological stress during completive events for Athletes.
- Investigate Innovative methods for assessing arousal in sports.
- Investigate the relationship between mental toughness and sports performance in different sports.
- Explore the relationship between athletes' self-efficacy beliefs, goal setting, and performance outcomes in different sports.
- Investigate the relationship between sleep quality, quantity, and athletes' performance and recovery.

Extended Response Questions

(15 marks)

Explain the concept of "flow" in sports psychology and its impact on athletic performance.

Describe how goal setting can positively influence an athlete's motivation and performance. Provide an example of a well-formulated goal in a sports context.

Discuss the relationship between stress and performance in sports. How can athletes manage stress effectively to optimise their performance?

Analyse the role of leadership in sports teams from a sports psychology perspective. How can effective leadership contribute to team cohesion and success?

Explain the role of sports psychology in promoting athlete health and well-being. How can mental health issues impact an athlete's performance, and what measures can be taken to support athletes' mental well-being?

Discuss the concept of burnout in the context of sports psychology. What are the signs of burnout, and how can athletes and coaches prevent and manage burnout effectively?

Compare and contrast the Self-Determination Theory (SDT) and the Achievement Goal Theory (AGT) in sports psychology. How do these theories explain athletes' motivation and behaviour in different sports contexts?

Analyse the impact of intrinsic and extrinsic motivation on athletes' performance and long-term engagement in sports. Provide real-life examples of how coaches can nurture intrinsic motivation in their athletes.

Compare and contrast the Individual Zones of Optimal Functioning (IZOF) model and the Multidimensional Anxiety Theory (MAT) in explaining athletes' optimal performance and anxiety regulation. How can this knowledge be applied by coaches to support athletes effectively?

SIS activities

THE BIOPSYCHOSOCIAL MODEL AND ITS APPLICATIONS IN SPORT/EXERCISE PSYCHOLOGY:

Select at least one point from each section to address the question in full. Discuss and analyse the relevance and applications of the biopsychosocial model in this specific field.

Introduction (10%): Provide a concise introduction to the biopsychosocial model, explaining its core components (biological, psychological, and social) and their interconnections. Briefly outline its significance in understanding human behaviour and health.

Biological Factors and Sport/Exercise Psychology (30%):

- Analyse how biological factors (e.g., genetics, neurochemistry, physiology) can influence an athlete's performance, motivation, and response to stress in sports and exercise settings.
- Discuss the role of the autonomic nervous system, endocrine system, and brain structures in shaping an athlete's mental and physical state during training and competition.
- Provide relevant studies or examples that support the impact of biological factors on athletic performance or psychological well-being.

Psychological Factors and Sport/Exercise Psychology (30%):

- Examine the psychological aspects (e.g., cognitive processes, emotions, personality traits) that can affect an athlete's motivation, focus, and resilience in sports and exercise activities.
- Discuss how psychological interventions such as goal setting, imagery, and mindfulness can enhance an athlete's performance and mental health.
- Incorporate real-life case studies or research findings that demonstrate the influence of psychological factors on athletic achievements.

Social Factors and Sport/Exercise Psychology (30%):

- Investigate the impact of social factors (e.g., family, coaches, teammates, cultural influences) on an athlete's development, motivation, and team dynamics.
- Examine the role of social support and social comparison in shaping an athlete's self-esteem and confidence in their abilities.
- Discuss how social stressors (e.g., media pressure, social media) can affect an athlete's mental well-being and performance, along with strategies to mitigate their negative effects.

Conclusion (10%): Summarise the key points discussed in the paper, emphasising the importance of the biopsychosocial model in sport/exercise psychology. Reflect on the model's potential applications in improving athletes' overall performance, mental health, and well-being. Suggest areas for future research and how advancements in understanding biopsychosocial interactions can contribute to enhancing athletic training and support.

Student Activity

Look back at the SIS chapter to refresh your memory of the various research designs that are used in the field of Psychology.

Below are several research hypotheses related to sport psychology. For each hypothesis, identify the most suitable research design and provide a rationale for your choice. Additionally, suggest specific research methods that would be appropriate for each design. Use your knowledge of sports psychology research methodologies to justify your selections.

Hypothesis 1:
Athletes who undergo a mindfulness-based intervention demonstrate a significant reduction in pre-competition anxiety compared to a control group.

Hypothesis 2:
There is a positive correlation between athletes' self-confidence levels and their overall performance in competitive sports.

Hypothesis 3:
Investigating the effectiveness of a goal-setting intervention on the performance of youth soccer players compared to a traditional training approach.

Hypothesis 4:
The influence of team cohesion on the performance and motivation of collegiate basketball players.

Hypothesis 5:
Exploring the impact of coach-athlete communication styles on athletes' satisfaction and commitment to their sport.

Hypothesis 6:
The effects of imagery techniques on the rehabilitation progress and psychological wellbeing of injured athletes.

Hypothesis 7:
Analysing the relationship between exercise intensity and mood states in recreational runners.

MULTIPLE CHOICE REVISION QUESTIONS

1. **Which of the following best describes sports psychology?**
   a) The study of physical activity and its effects on the body.
   b) The application of psychological principles to improve athletic performance and overall well-being.
   c) The study of sports statistics and performance data.
   d) The analysis of sports injuries and rehabilitation techniques.

2. **What is the primary goal of visualisation techniques in sports psychology?**
   a) To enhance an athlete's sensory perceptions during a game.
   b) To reduce anxiety and stress before a competition.
   c) To increase an athlete's reaction time during training.
   d) To improve physical endurance during prolonged activities.

3. **Self-talk is an essential aspect of sports psychology. Which type of self-talk is most effective for boosting confidence and motivation?**
   a) Positive and encouraging self-talk.
   b) Self-critical and perfectionistic self-talk.
   c) Neutral and non-emotional self-talk.
   d) Negative and self-defeating self-talk.

4. **Which sports psychology technique involves breaking down a complex skill into smaller, manageable parts for effective learning?**
   a) Goal setting.
   b) Imagery.
   c) Choking under pressure.
   d) Chunking.

5. **The inverted-U hypothesis suggests that the relationship between arousal and performance follows a(n):**
   a) Linear trend, where increased arousal leads to improved performance.
   b) Inverted-U trend, where moderate arousal is associated with optimal performance.
   c) U-shaped trend, where low and high arousal levels are linked to superior performance.
   d) Constant trend, where performance remains stable regardless of arousal levels.

6. **According to the Social Learning Theory, individuals can learn new behaviours and acquire motivation through:**
   a) Reinforcement and punishment.
   b) Inherited traits and genetics.
   c) Instinctual responses and reflexes.
   d) Meditation and mindfulness practices.

7. **Which of the following is NOT a mental skill commonly taught and utilised in sports psychology?**
   a) Relaxation techniques.
   b) Attentional focus strategies.
   c) Avoidance of goal setting.
   d) Imagery and visualisation.

8. **Which of the following factors can contribute to the development of sports-related eating disorders?**
   a) Effective time management skills.
   b) A supportive and positive team environment.
   c) Unrealistic body image expectations in the sports culture.
   d) High levels of intrinsic motivation and self-confidence.

9. **Sports psychology interventions aimed at improving an athlete's overall wellbeing often include:**
   a) Encouraging athletes to ignore their emotions during challenging times.
   b) Advocating for a "no rest" policy to maximise training opportunities.
   c) Incorporating mindfulness and relaxation techniques to manage stress.
   d) Focusing exclusively on physical training while neglecting psychological aspects.

Answers:
Multiple choice: b,b,a,d,b,a,c, c, c

Sport/ exercise Psychology textbooks

Foundations of Sport and Exercise Psychology 7th Edition With Web Study Guide-Loose-Leaf Edition. **Daniel Gould** and **Robert S. Weinberg**. (Introductory textbook for sport and exercise psychology courses; ideal for students pursuing a career as a sports psychologist, coach, physical educator, fitness instructor, athletic trainer, physical therapist, or sports medicine professional. Also a reference for libraries and sports psychologists).

Sport and Exercise Psychology: A Canadian Perspective" by Peter R. E. Crocker, Mary Ann Evans, Diane E. Mack, and Peter R. E. Crocker Jr. (While this book is written with a Canadian perspective, it covers the fundamental principles of sport and exercise psychology that are applicable globally).

Foundations of Sport and Exercise Psychology" by Robert S. Weinberg and Daniel Gould (This widely used textbook provides a comprehensive introduction to the field, covering topics such as motivation, anxiety, goal-setting, and team dynamics).

The Psychology of Exercise: Integrating Theory and Practice" by Curt L. Lox, Kathleen A. Martin Ginis, Steven J. Petruzzello, and Heather J. Hausenblas (While focusing on exercise psychology, this book explores how psychological principles influence exercise behaviour and outcomes).