



# PSYCHOLOGY

**Units 3 and 4**

Edition 8.0

UPDATED FOR  
2023 STUDY  
DESIGN

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## FROM THE AUTHOR

Thanks for supporting Connect! These notes are going to be an incredibly helpful tool on your VCE Psychology journey, so make sure you use them wisely. There are a lot of clever tips and detailed summaries in the pages you're about to read but try not to use them as a substitute for putting in your own work; at the end of the day, that's what's going to give you your best mark possible!

VCE Psychology is a content heavy subject, so before you do anything, it's important that you make sure you have your theory knowledge under control throughout the year. If you don't understand something, ask straight away so you're not left cramming during that all-important exam study time. On a similar note, try to focus on the big ideas that you know are definitely going to be on the exam, such as Classical and Operant Conditioning, Mem, and Mental Health, and add in the finer details later. Last but not least, start doing practice questions now; the questions in your textbook are fantastic for helping you consolidate your learning throughout the year in preparation for the end-of-year exam, so start now and you will reap the benefits later!

Psychology is a fascinating and extremely rewarding subject that you will get so much out of, as long as you put the work in. So, make the most of the year and of your final step in the VCE journey.

Good luck and happy studying!

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## UNIT 3 | AOS 1 – HOW DOES THE NERVOUS SYSTEM ENABLE PSYCHOLOGICAL FUNCTIONING?

### Key Concepts

#### Nervous system functioning:

- Explain the roles of different subdivisions of the nervous system (central and peripheral nervous systems) in responding to, and processing and coordinating with, sensory stimuli
- Distinguish between unconscious and conscious responses, including the spinal reflex

#### Neurotransmitters and Neuromodulators:

- Explain the role of neurotransmitters in neural transmission, including excitatory effects (glutamate) and inhibitory effects (GABA)
- Outline the role of neuromodulators such as dopamine and serotonin

#### Synaptic Plasticity:

- Explain synaptic plasticity in terms of long-term potentiation and long-term depression
- Describe how neural connections are modified through sprouting, rerouting and pruning

#### Acute and Chronic Stress:

- Distinguish between internal and external stressors
- Explain the fight-flight-freeze response in relation to acute stress
- Outline the role of cortisol in chronic stress

- Describe the interaction of gut microbiota with stress and the nervous system through the gut-brain axis

**Models of stress:**

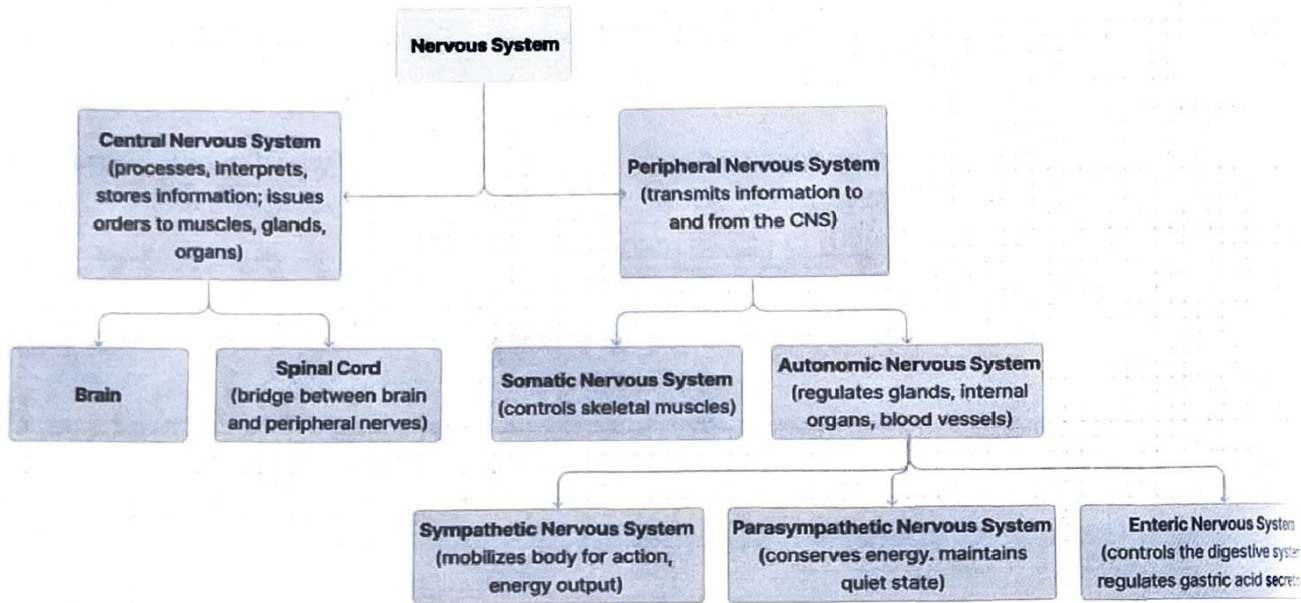
- Describe Hans Selye's General Adaptation Syndrome as a biological model of stress, including alarm reaction (shock/countershock), resistance and exhaustion
- Explain stress as a psychological process (with reference to Lazarus and Folkman's Transactional Model of Stress and Coping)

**Coping with stress:**

- Explain the use of approach and avoidance strategies when coping with stress
- Define and explain the importance of context-specific effectiveness and coping flexibility in relation to stress management

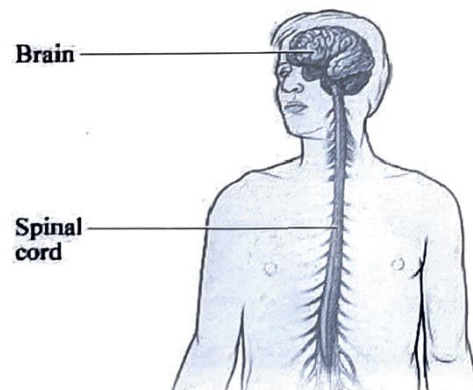
## NERVOUS SYSTEM FUNCTIONING

The nervous system is divided into **two main systems**, from which other more specific systems branch off. Make sure you know this diagram and what each system does like the back of your hand!



## Central Nervous System (CNS)

The **CNS** is one of the two major subdivisions of the human nervous system, consisting of the **brain and spinal cord**. Generally, the main role of the central nervous system is to process sensory information and activate appropriate behavioural responses. The brain controls almost everything we think, feel, and do. The spinal cord contains nerve pathways that link the brain and other parts of the body, as well as structures responsible for reflex actions. The brain and spinal cord usually function in a coordinated way.





## The spinal cord

### The role of the spinal cord is to:

- Transfer sensory information from receptors in the body (PNS) to the brain;
- Transfer motor information from the brain to the skeletal muscles and glands (PNS);
- Control and enable the spinal reflex.

The spinal cord is a part of the human central nervous system comprising nerve tissue that extends from the base of the brain and down within the spinal column (i.e. backbone) to just below the waist, connecting the brain to other parts of the body through the peripheral nervous system. Its major function is to link the brain with other parts of the body. In particular, neurons and bundles of nerve fibres within the spinal cord pass sensory information on from the PNS to the brain and transmit motor information from the brain to the PNS.

The spinal cord usually works in a coordinated way with the brain. However, simple, automatic, involuntary responses, known as **spinal reflexes**, are controlled by interneurons independently of the brain. This enables a quicker response to the stimulus producing the reflex.

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**TYPICAL TRAPS:** You cannot write that the spinal cord sends messages from the CNS to the PNS because the spinal cord makes up the CNS (along with the brain).

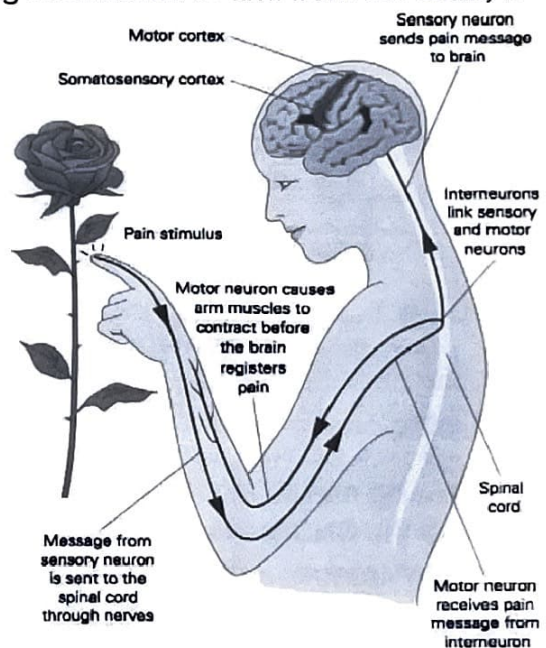
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## The spinal reflex

The spinal cord is not only responsible for carrying information to and from the brain; it also has an important role in **unconscious reflex reactions**.

During the spinal reflex:

- something occurs in the external environment, usually pain, resulting in sensory receptors in the somatic nervous system being stimulated
- a sensory message travels via a sensory neuron to the spinal cord
- instead of this message then being sent to an interneuron in the brain, it is translated straight away in the spinal cord resulting in a 'reflex arc'
- a motor message is sent back down a motor neuron in skeletal muscle to generate a withdrawal reflex which causes the subject to move away from the stimulus before the brain processes the message of pain

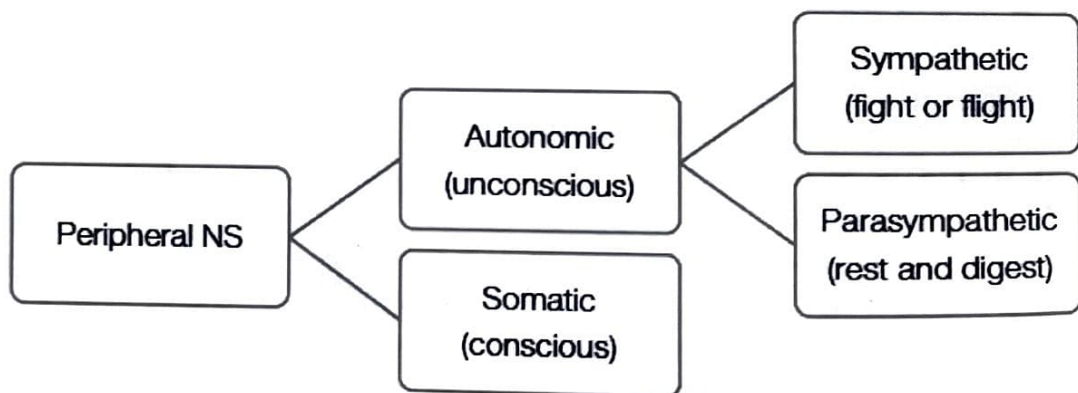
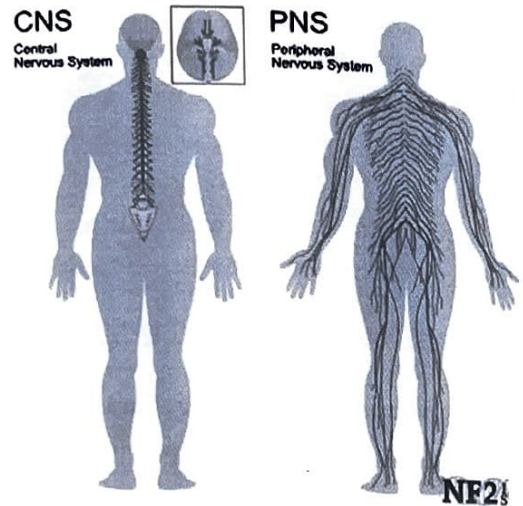


This is important in ensuring a fast reaction time to increase chances of survival and to prevent serious damage from occurring.

Once the important involuntary motor reaction has occurred, a sensory message is then sent to the brain via interneurons in the spinal cord, so it can register the pain/sensation of what just occurred. If necessary, voluntary actions can follow to further protect oneself from the stimuli like moving away from the source of pain.

## Peripheral Nervous System (PNS)

The **PNS** comprises all parts of the nervous system that are outside the brain and spinal cord. The PNS links the CNS to all other parts of the body, carrying messages to and from the CNS. For example, the PNS links the CNS to sensory receptors and transmits messages from the CNS to the muscles and glands via motor neurons. The PNS has two subsystems called the somatic nervous system and autonomic nervous system (which is further split into the sympathetic, parasympathetic nervous system and enteric nervous system).



## Somatic Nervous System (SNS)

The somatic nervous system is a subsystem of the peripheral nervous system, comprising nerves that carry messages from the sensory receptors (e.g. in the eyes or ears) to the CNS, as well as nerves that carry messages from the CNS to control the **voluntary movements** of skeletal muscles (those attached to skeleton or bones).

The somatic nervous system has a sensory function as well as a motor function. However, **it does not control non-skeletal (smooth) muscles** such as the heart, stomach, and intestines.

It consists of:

- **Efferent Nerves** which carry motor messages from the CNS to skeletal muscles in the PNS. This refers only to voluntary body movement controlled by the motor cortex.
- **Afferent Nerves** which carry sensory messages from sensory receptors in the body (PNS) toward the CNS. These messages are then interpreted in the somatosensory cortex of the parietal lobe.

It is important to remember that the **somatic nervous system** is responsible for **conscious, voluntary movement** of the skeletal muscles.

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**MNEMONIC:** To remember that afferent nerves carry sensory messages and efferent nerves carry motor messages use the word 'SAME'. **S**ensory **A**fferent **M**otor **E**fferent.

---

### Autonomic Nervous System

The **ANS** is one of two subdivisions of the PNS. Many of its functions are autonomous; that is, they function independently and are self-regulating. The circulatory, respiratory, and digestive systems are under ANS control and they perform their roles automatically without the need for conscious voluntary regulation from the brain.

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**Typical Traps:** Be careful with the wording when referring to ANS. It is the *autonomic* system not automatic system, however, many of its processes occur *automatically*.

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The ANS has three divisions: **sympathetic**, **parasympathetic** and **enteric** nervous systems. The parasympathetic and sympathetic divisions have opposite functions but are interactive and work together to maintain internal balance.

#### **Sympathetic nervous system**

The part of the autonomic nervous system involved in **arousing** and energising the body for action, particularly in times of **stress** or threat. It activates the body's fight-flight response when a psychological or physical threat is perceived.

#### **Parasympathetic nervous system**

The part of the autonomic nervous system involved in calming the body and conserving energy. It maintains **homeostasis** (constant internal body environment), and it counteracts the effects of the sympathetic nervous system to return the body back to a normal state.

#### **Enteric nervous system**

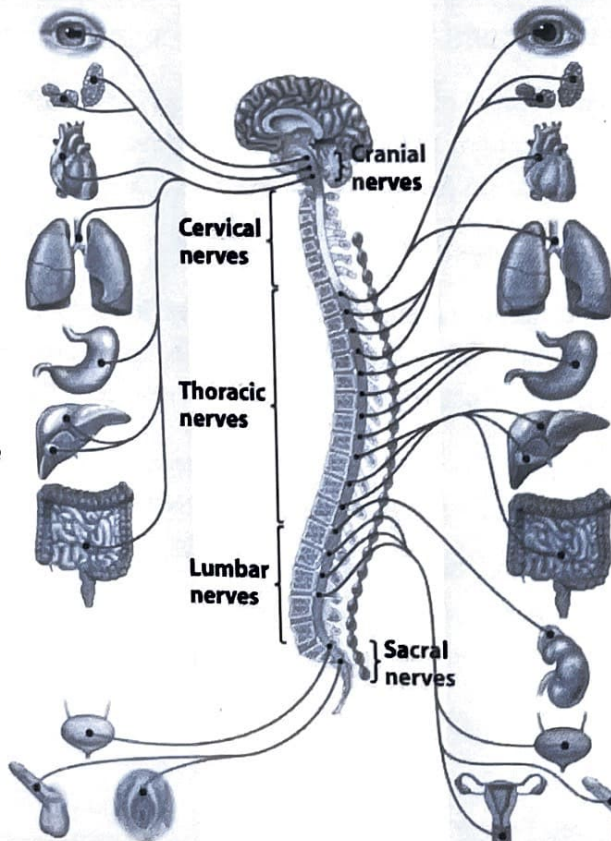
The part of the autonomic nervous system involved in **regulating** digestive system processes.

**MNEMONIC:** Sympathetic is active when you are **Stressed**.  
Parasympathetic is active when you are at **Peace**.

Bodily Organ	Bodily Function	Sympathetic Action	Parasympathetic Action
<b>Adrenal Gland</b>	E.g. Secrete the hormones adrenaline and noradrenaline	Stimulates secretion resulting in increased heart rate, blood pressure, breathing rate, relaxation of intestinal muscles	Inhibits secretion
<b>Bladder</b>	Urine storage	Relaxes	Increases contractions
<b>Bronchioles of lungs</b>	Breathing	Dilates (expands)	Contracts
<b>Gall Bladder</b>	Stores bile	Inhibits the release of bile	Stimulates the release of bile
<b>Genitals</b>	Reproduction	Excites	Relaxes
<b>Heart</b>	Pumps blood	Accelerates heartbeat	Slows heartbeat
<b>Intestines</b>	Digestion	Relaxes	Increases contractions

**PARASYMPATHETIC NERVES**  
"Rest and digest"

- Constrict pupils
- Stimulate saliva
- Slow heartbeat
- Constrict airways
- Stimulate activity of stomach
- Inhibit release of glucose; stimulate gallbladder
- Stimulate activity of intestines
- Contract bladder
- Promote erection of genitals



**SYMPATHETIC NERVES**  
"Fight or flight"

- Dilate pupils
- Inhibit salivation
- Increase heartbeat
- Relax airways
- Inhibit activity of stomach
- Stimulate release of glucose; inhibit gallbladder
- Inhibit activity of intestines
- Secrete epinephrine and norepinephrine
- Relax bladder
- Promote ejaculation and vaginal contraction

<b>Liver</b>	E.g. Produces bile to aid digestion, maintains blood sugar (glucose) levels	Increases the release of glucose (sugar)	Decreases the release of glucose (sugar)
<b>Pupils</b>	Regulate the amount of light entering the eye	Dilates (expands)	Contracts
<b>Salivary glands</b>	Digestion	Inhibits production of saliva	Saliva returns
<b>Stomach</b>	Digestion	Decreases contractions	Increases contractions
<b>Sweat glands</b>	Perspiration to lower body temperature	Increases perspiration in response to body's expenditure of greater energy and heat	Decreases perspiration

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**EXAM TIP:** To enhance your explanation when tackling these questions, you may like to include why these bodily changes occur. E.g., the pupils dilate when the sympathetic nervous system is activated in a fight/flight/freeze scenario to enable the organism to see more, and hence, have an enhanced survival response.

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## Neurotransmitters

**Neurotransmitters** are chemical substances produced by neurons that carry a message to other neurons, muscles, or glands. They work by binding to receptor sites on the dendrites of other neurons or receptors on muscles/glands to initiate a specific response.

Neurotransmitters can be **excitatory** or **inhibitory**. Excitatory neurotransmitters stimulate or activate post-synaptic neurons or muscles/glands, whereas inhibitory neurotransmitters block or prevent post-synaptic neurons from firing or muscles/glands from functioning.

**Glutamate** is the most common excitatory neurotransmitter. Its role is to enhance information transmission by making postsynaptic neurons **more likely to fire** (send and receive neural messages). This, in turn, strengthens the neuronal pathways, allowing for the formation of stronger memories.

**Gamma Amino Butyric Acid (GABA)** is the primary inhibitory neurotransmitter in the CNS. Its role is to block transmission by making postsynaptic neurons **less likely to fire**. Without the inhibitory effects of GABA, activation of postsynaptic neurons could get out of control, resulting in seizures.

Glutamate and GABA **counterbalance** each other to ensure optimal functioning of the CNS.



## Neuromodulators

A **neuromodulator** is a chemical substance that is released by neurons, regulating and altering neural transmission that occurs between neurons. They impact the strength of neural transmission by increasing the excitatory or inhibitory effect of neurotransmitters through controlling the number of neurotransmitters that are released at a time.

Neuromodulators impact groups of multiple neurons that are either nearby or far away from its location, allowing for widespread responses to occur. Two common examples of neuromodulators are **dopamine** and **serotonin**.

**Dopamine** is a neuromodulator that can have a range of psychological and physiological effects, including impacts on voluntary motor movement, pleasure, motivation and memory.

An important function of dopamine is that it allows people to feel good. Usually when doing or thinking about something you enjoy, dopamine is released which causes feelings of happiness and satisfaction. Because the secretion of dopamine causes feelings of pleasure, it can often increase people's motivation to continue their behaviour,

as it will result in feeling good. This creates somewhat of a **reward system** where an individual can complete a certain behaviour so that dopamine will be released, therefore will feel pleasure and satisfaction. However, sometimes this may contribute to the development of addictions as people seek feelings of pleasure caused by dopamine, therefore may continue behaviours such as gambling in hopes to win and experience those feelings.

**Serotonin** is a neuromodulator that has a large impact on **mood, sleep quality** and the **digestive system**.

Serotonin regulates mood, where high levels of serotonin are associated with feelings of being happy, calm and content, and low levels of serotonin are associated with anxiety, depleted moods and can be a contributing factor to mental health conditions like depression.

Serotonin also impacts sleep as it regulates the quality of sleep and also when we become tired. Serotonin is needed to produce melatonin, the sleep-inducing hormone, therefore, allowing people to become tired or drowsy and want to go to sleep.

It also affects the digestive system as serotonin is mainly found in the gastrointestinal tract. Digestion increases with high serotonin levels, allowing for healthy bowel movements to keep the body functioning and free of any toxins. Also, serotonin causes our appetite to decrease when consuming food.

### NEUROTRANSMITTERS

- Carry messages from the presynaptic neuron to have a direct effect on the postsynaptic neuron
- Have an effect on one or two postsynaptic neurons
- Travel to nearby receptor sites
- Can produce rapid responses from other neurons, however, will last for a shorter period

### NEUROMODULATORS

- Modify transmission of neurons by regulating the number of neurotransmitters released
- Have an effect on groups of multiple different neurons
- Travel to nearby or far away receptor sites
- Produces a slower but longer-lasting response from other neurons

- Both are chemical messengers
- Both released by presynaptic neurons
- Both bind to a specifically shaped receptor site corresponding to its own shape

## Synaptic Plasticity

**Plasticity** is the ability of the brain to change its neural structure or function through experience across the lifespan. The brain can reorganise and reassign its neural connections and pathways based on which parts are overused or underused. Its structure is constantly remodelled by its experiences. Two forms of plasticity are long-term **potentiation** and **long-term depression**.

Plasticity is required for learning to occur and is present **throughout a person's life**.

### Long-Term Potentiation and Long-Term Depression as Forms of Synaptic Plasticity

When neurons in a circuit are activated through use, the flow of information in the circuit becomes easier. Collectively, these changes are known as **long-term potentiation (LTP)**.

**LTP** refers to the long-lasting strengthening of synaptic connections due to repeated use resulting in enhanced functioning of neurons along a neural pathway.

Any experience that results in memory production will trigger **physical changes** in the brain at the neuronal level, strengthening connections between neurons involved in the process to increase the ease of future transmissions.

**Long Term Depression (LTD)** is the opposite of LTP, occurring when there is a reduced frequency of nerve impulses reaching the synapses, causing the synaptic connections along a neural pathway to **weaken**. Through disuse, the signals that are transmitted between two neurons become less efficient (less responsive to neurotransmitters released and their effect).

### Modifying Connections Between Neurons: Sprouting, Rerouting & Pruning

**Sprouting** is where there is growth of new axon terminals and dendrites on neurons that have been frequently stimulated. This causes an increase in synaptic connections due to each neuron having more branches that form neural pathways, thus making transmission more effective. This is often seen during **LTP** as sprouting results in strengthened neural pathways.

**Re-routing** occurs when two neurons have formed a neural pathway, but one becomes damaged and can no longer function. The undamaged neuron will change its pathway to make synaptic connections with a new, functioning neuron, so that it can still undergo neural transmission. Re-routing may also occur when an alternative pathway is created to adapt to a new experience. If a new technique or process is learned, the existing pathway is weakened, as an alternative pathway is created to adapt to the new behaviour.



**Pruning** is the opposite of sprouting. It is where existing axon terminals and dendrites are removed due to sub-optimal stimulation. This means that there will be a reduction in synaptic connections between neurons, causing a decrease in functioning of neural pathways. This is often seen during **LTD** as pruning results in weakened neural pathways.

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**Example:** In Year 7 maths students learnt how to do long division. Student A continued to study maths until Year 12 and kept on using long division over these 5 years; as a result, Long Term Potentiation would have occurred in their brain and the neural pathways representing how to do long division would remain very strong due to the repeated co-activation of neurons every time the student uses long division. Student B dropped out of school in Year 8 to pursue an elite sporting career, so never did long division again in their life; as a result, Long Term Depression occurred in their brain and the neural pathways representing how to do long division became very weak and they could no longer remember how to do it.

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## STRESS AS A PSYCHOBIOLOGICAL PROCESS

### Acute & Chronic Stress

The World Health Organization defines stress as **a state of worry or mental tension caused by a difficult situation.**

- **Internal stressor:** Sources of stress that are inside us and often the most common sources of stress (e.g. fear, your emotional state, your mood).
- **External stressor:** Sources of stress that we are aware of around us (e.g. trauma, life experiences, relationships with others).

#### Fight-Flight-Freeze

What used to be known as just the Fight or Flight response has a new addition...**freeze**.

In a life-threatening situation, it was once thought we had one of two options, to fight the threat, or to run from it. In both cases, we need extra energy supplied by the stress hormones adrenaline and noradrenaline, which are released when our sympathetic nervous system is activated.

This response is important in Stage 1 of Selye's model, alarm.



However, recently 'freeze' was added to this response as it has been recognized that often in life-threatening scenarios, people may tend to neither fight nor flee, but remain where they are

completely frozen in front of the threat. This occurs when the sympathetic and parasympathetic nervous system are activated and cancel each other out. Whilst this may not seem very beneficial in a life or death situation, it works to protect us by making us seem dead to a predator. During the 'freeze' state our blood pressure drops and we fall to the ground; reducing blood loss if any injuries are sustained and ensures blood is kept flowing to our brain.

**Example** An example of this 'freeze' mechanism was shown when a man was attacked by a grizzly bear in America; instead of running or fighting the bear, the man fell to the ground and 'played dead' until the bear let him go. Despite sustaining some serious injuries, the man survived thanks to the 'freeze' response.

This response plays a role in **acute stress**. This means that it occurs when a stressor presents itself, but the associated state of stress only lasts a relatively short period of time.

### Cortisol

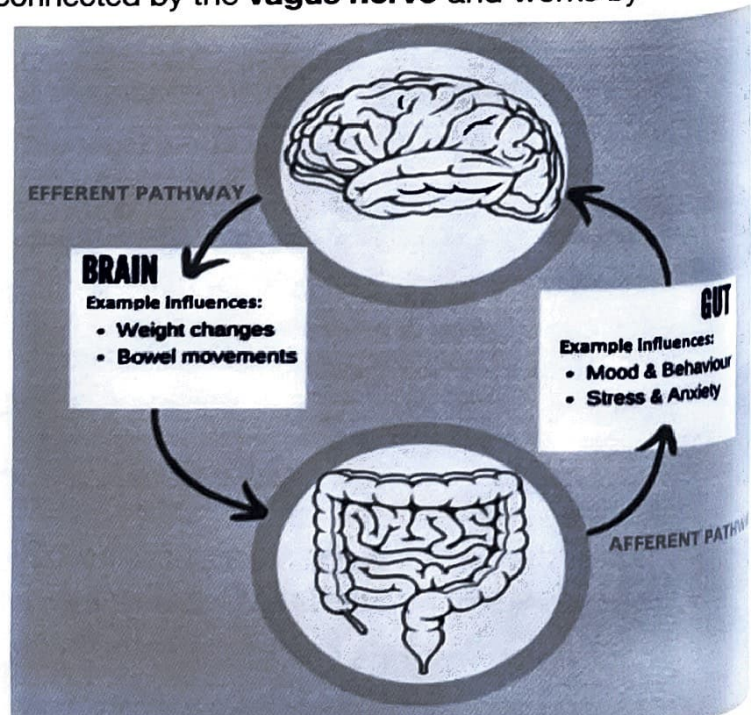
**Cortisol** is a stress hormone that helps deal with a stressor overtime. It does this by increasing the body's energy supply and suppresses unnecessary bodily functions such as the immune system. Because adrenaline cannot last long in the body, cortisol is released as it lasts for a relatively long period of time. This means it has an important role in **chronic stress** due to its ability to be sustained in the body.

## The Gut-Brain Axis

The **gut-brain axis** is an emerging area of research focused on the communication system between the brain in the central nervous system, including the **hypothalamic-pituitary-adrenal (HPA) axis**, and the gut in the enteric nervous system. The main premise behind this axis is that the brain can influence gut health, and gut health can impact the brain and therefore, mental health.

The two-way communication system is connected by the **vagus nerve** and works by sending messages through **afferent pathways** from the gut to the brain. More specifically, it sends messages to the **hypothalamus**, which controls hormones related to homeostasis, appetite and emotion. The gut also sends messages to parts of the brain that play a role in emotions and memory.

Another pathway of communication in the GBA is the **efferent pathways** that allow for messages to be sent from the brain to the gut to maintain the



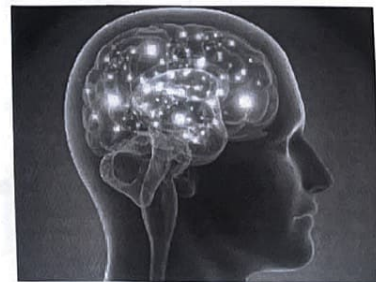
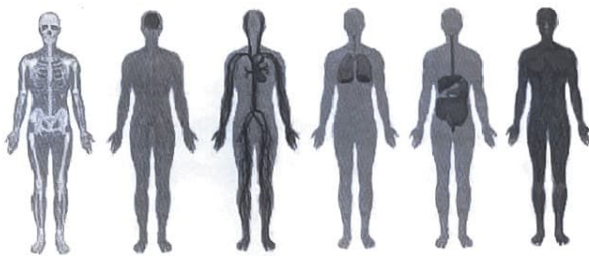
physiological functioning of the gastrointestinal tract.

**Gut microbiota** is found in the gut, specifically the digestive tract. They are microorganisms that assist with bodily functions like digestion and the immune system. It has been found that gut microbiota can be influenced by an individual's external environment and psychological factors such as emotions. This explains how the brain sends information to the gut via efferent pathways. For example, when an individual is in a state of stress for a prolonged amount of time, cortisol may be released into their body. This can impact the gut microbiome as it alters its ability to function, therefore may deplete the immune system, increasing susceptibility to illness.

The gut microbiota has also been found to have impacts on psychological functioning and mental health. This is associated with the afferent pathway of information being sent from the gut to the brain. Many brain chemicals associated with mood regulation, emotion and memory, such as serotonin and dopamine, are produced in the gut. This means that by keeping the gastrointestinal tract healthy, such as by keeping a healthy diet, the gut microbiome is also kept healthy. As a result, the gut microbiota can continue to produce these chemicals at an adequate level, allowing for the effective functioning of psychological processes like mood regulation. With these processes continuing to function effectively, individuals are more likely to have feelings of happiness, and less likely to experience anxiety or depression, thus reducing the likelihood of developing a mental health condition.

## Models of Stress

It is important to view stress as a **psychobiological process**, meaning that it involves both physical processes in the body and thought processes in the mind. In VCE Psychology we look at two different models to explain stress: **Selye's model** is a biological explanation of stress, whereas **Lazarus and Folkman's model** is a psychological explanation of stress.



### Selye's General Adaption Syndrome

This model of stress describes **three predictable stages** the body uses to respond to stress, known as General Adaptation Syndrome, as proposed by Hans Selye. This model

explains in biological terms how the body is likely to react to an event that threatens an organism's well-being.

### Stage 1 – Alarm-reaction

This stage is separated into two sub-stages: **shock** and **countershock**. Initially, in **shock**, resistance to the stressor is temporarily lowered. The body acts as if it is injured, for example, blood pressure drops. Immediately after, in **countershock**, a message about the perceived stressor is sent to the hypothalamus, which stimulates the pituitary gland to release hormones (such as adrenaline, noradrenaline, and cortisol) that initiate the fight-flight or freeze response by acting on the sympathetic nervous system. These hormones give you a burst of energy to allow you to manage the stressor, thus your body's resistance to stress increases above the normal level.

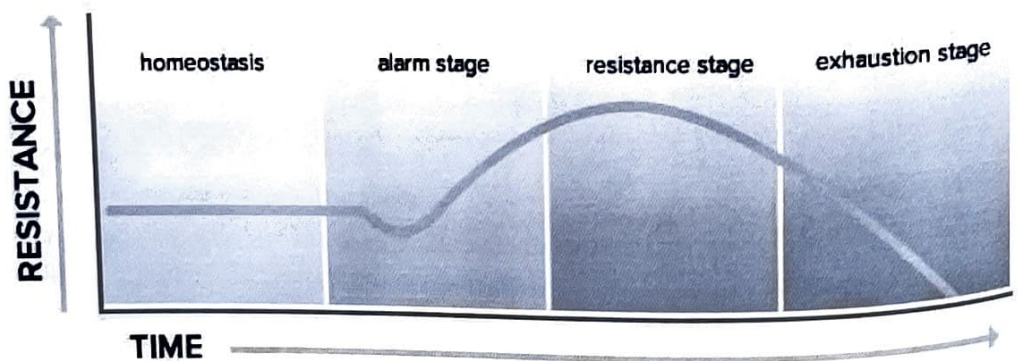
### Stage 2 - Resistance

During this stage the body has responded to the stressor and the threat has been reduced. As a result, the **parasympathetic nervous system** is activated, energy is allocated to repair bodily tissues, and levels of stress hormones decrease from the alarm-reaction stage but are still higher than normal. If the stressor is still present, the body will remain 'on alert' and continue to attempt to deal with the stressor by releasing **cortisol**. Although the body can resist the stress for some time, overall health afterwards may decrease as the increased presence of cortisol reduces the ability of the body to respond to disease such as colds and flus.

### Stage 3 - Exhaustion

During this stage, **stress has persisted** for a significant time period and the body loses its ability to combat the stressor. This leads to what most people recognize as 'burning yourself out'. The body becomes more susceptible to stress-related diseases, such as high blood pressure, bacterial and viral infections, and even heart attack, since the immune system is weakened by the stress hormones (particularly cortisol) circulating throughout the body in the bloodstream.

### Selye's General Adaptation Syndrome



Overall, the General Adaptation Syndrome model provides a clear explanation of how the body responds and adapts to stressors. However, in Selye's research, the GAS model was only conducted on animals so their responses to stress may not be fully applicable.

to humans. Additionally, the model does not take into consideration individual differences in the way people view or evaluate different stressors.

### Transactional model of stress and coping

American psychologists Richard Lazarus and Susan Folkman developed the **Transactional Model of Stress and Coping** to describe and explain individual differences in the stress response from a psychological perspective. Their model focuses on **two key psychological factors** that determine the extent to which an event is experienced as stressful;

- The **meaning** of the event to the individual, and;
- The individual's **judgement** of their ability to cope with it.

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**Stress is not a result of the individual alone or the environment alone. The environment can influence the individual, and the individual can also influence the environment.**

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**Each individual responds differently to the same situation because of how they appraise the situation.** For example, in a traffic jam, one driver might think it's not a big deal because it gives them a chance to jam to the radio, while another might become very frustrated because they're late for an appointment.

According to the Lazarus and Folkman model, **stress is largely 'in the eye of the beholder'**. It is always **subjective** and therefore a highly personal process. It also depends on our own estimation of our ability to cope with the stressor. For these reasons two individuals usually assess the same stressor differently.

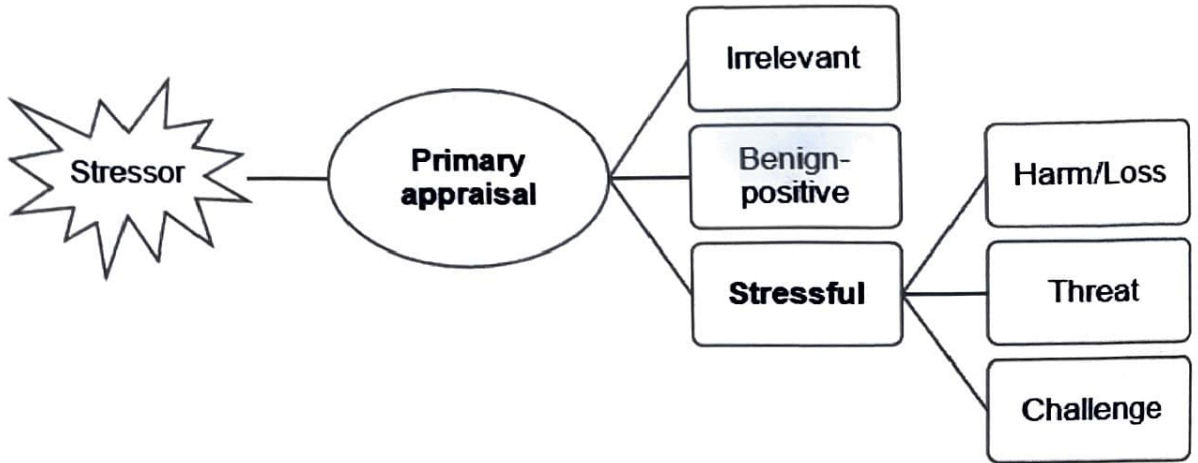
In a **primary appraisal**, we judge the significance of the situation. Firstly, we determine whether the event is actually stressful or relevant to us. This can be classified as:

- **'Irrelevant'** when the situation does not apply to us or it doesn't matter (e.g. "I'm only running late to meet a friend, they can wait")
- **'Benign-positive'** when the situation could be stressful in a good or beneficial way (e.g. becoming a parent for the first time)
- **'Stressful'** when the situation is important and relevant (e.g. "I'm running late for an important meeting")

If we perceive the situation as stressful, we will further classify the stress as:

- **'Harm/Loss'** when there is an assessment of how much damage has already occurred (e.g. "I performed badly in that first exam")
- **'Threat'** when there is an assessment of harm/loss that may not have yet occurred but could occur in the future (e.g. "I might fail my next SAC")

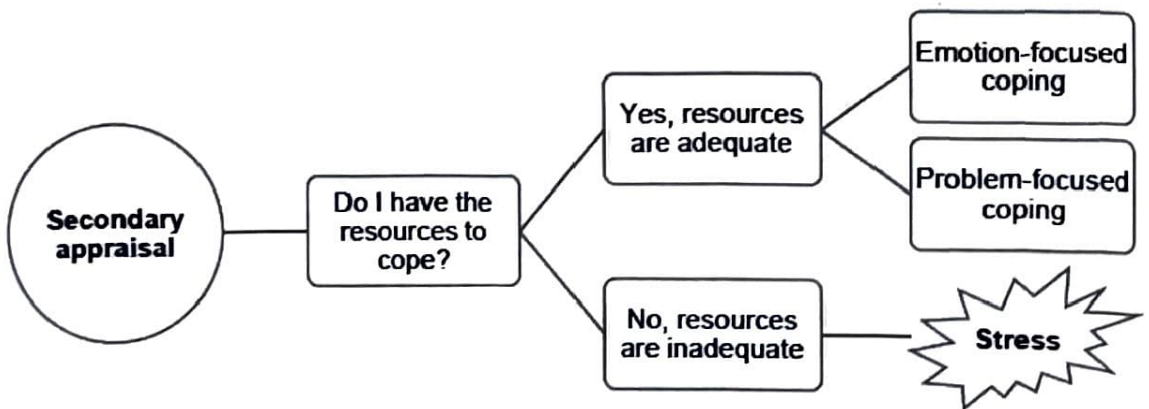
- **'Challenge'** when there is an assessment of the potential for personal gain or growth from the situation (e.g. "Doing badly in that first exam will make me work harder")



In a **secondary appraisal**, we evaluate our resources and options for coping with a stressor. Do you have the resources to cope with it?

If the person believes they have adequate resources, to meet the demands, the situation is judged as not stressful. Whereas, if the person believes they don't, they evaluate the situation as stressful!

The transactional model also details a few coping strategies. **Coping** is the process of changing cognitive and behavioural efforts to manage stressors that are appraised as threatening. Therefore, coping is an attempt to manage the demands of a stressor in some effective way.



Examples: denial, acceptance, distancing, venting emotions, and wishful thinking.

## Coping with Stress

Types of strategies

- **Approach strategies** involve efforts to manage or change the cause or source of the difficulty (the stressor). This form of coping is usually used when the individual has the ability to control the situation. This is often referred to as problem-focused coping.
  - Examples: learning new skills to deal with the stressor, and finding out more information about the actual stressor.
- **Avoidance strategies** involve strategies to aid our emotional responses to the stressor done by decreasing the emotional content of our stress response. This form of coping is usually used when we have little to no control over a situation and therefore can't do anything to change the circumstances. This is often referred to as emotion-focused coping.
  - Examples: denial, acceptance, distancing, venting emotions, and wishful thinking.

Context-specific effectiveness and coping flexibility

- **Context-specific effectiveness** assesses if there is a 'good fit' between the coping strategy that is used and the stressful situation.
  - Example - if you are preparing for an examination; planning out a study routine would be a 'good fit', whereas avoidance and denial would not be.
- **Coping flexibility** is the ability to effectively modify and adjust one's coping strategies according to the demands of the situation.
  - Example - if somebody previously crammed for an assessment and that led to high levels of stress, good coping flexibility would be indicative of altering this process in similar situations (begin studying earlier for future assessments).

Strengths and limitations of the transactional model

STRENGTHS	LIMITATIONS
<p>It helps explain why different individuals respond in <b>different</b> ways to the same types of stressors since it considers the individual as playing an active role in appraising the stressor.</p>	<p>It's <b>difficult to test</b> through experimental research; this is due to the subjective nature, variability, and complexity of individual responses to stressful experiences.</p>
<p>It proposes different <b>methods for managing</b> psychological responses to stressors and has consequently enhanced understanding of the importance of stress-management strategies and programs. It <b>proposes</b> different <b>methods for managing</b> psychological responses to stressors and has consequently enhanced understanding of the importance of stress-management strategies and programs.</p>	<p>Primary and secondary appraisals can interact with one another and are often undertaken <b>simultaneously</b>, this makes it difficult to study them since they cannot be separated as two distinct variables.</p>
	<p>Some researchers <b>doubt that we actually need to appraise something</b> as causing stress in order to have a stress response, i.e. it's not a completely conscious process. For example, someone might feel a little 'on edge' and experience stomach aches and other reactions associated with stress a few weeks before an important exam, which is well before they have begun to consciously think about preparing for it.</p>



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In past exams, students have often gotten confused between elements of primary and secondary appraisal. Consider this question from the 2021 VCAA exam:

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*Use the following information to answer Questions 19 and 20.*

Tracy received the news that her audition for the lead role in the school play was successful.

**Question 19**

According to Lazarus and Folkman's Transactional Model of Stress and Coping, which one of the following may best describe Tracy's initial reaction to the news?

- A. She recalls that learning lines has always been easy.
- B. She views it as an opportunity to begin her acting career.
- C. She decides to learn the rest of the lines in the play's script with a friend.
- D. She decides that she does not have the resources to cope due to the stress of the news.

The question directly relates to Tracy's **initial reaction** to the news, which in the Lazarus and Folkman's Transactional Model of Stress and Coping refers to her **primary appraisal** of the stimulus. Tracy views the news as an opportunity which is the only answer including a primary appraisal, determining that her gaining the lead role is benign-positive rather than stressful. A, C and D are all examples of **secondary appraisals** or methods of **coping** which would not be present in an initial reaction in the Transactional Model.

## UNIT 3 | AOS 2 – HOW DO PEOPLE LEARN AND REMEMBER?

### Key Concepts

**Approaches to understand learning:**

- Explain classical conditioning as a three-phase process (before, during and after conditioning) that results in involuntary association between the neutral stimulus and unconditioned stimulus to produce a conditioned response
- Explain Operant Conditioning as a three-phase model (antecedent, behaviour and consequence) involving reinforcers and punishment
- Describe Observational Learning as a social-cognitive approach to learning
- Describe approaches to learning that situate learners in a system, illustrated by Aboriginal and Torres Strait Islander ways of learning through relationships and multimodal systems patterned on Country

### The Psychobiological process of memory:

- Describe how sensory stimuli are encoded, stored and retrieved from memory using the multi-store model of memory (Atkinson-Shiffrin)
- Outline the function, capacity and duration of memory (sensory memory, short-term memory and long-term memory)
- Explain the interaction between the brain regions involved in the formation and storage of long-term memory
- Outline the role of episodic and semantic memory in retrieving autobiographical events and constructing possible imagined futures
- Describe post-mortem studies of those with Alzheimer's disease and research of those with aphantasia to explain differences in mental imagery
- Explain the use of mnemonics in written cultures (acronyms, acrostics and the method of loci) to increase memory formation and retrieval
- Explain the use of mnemonics in oral cultures, as seen by Aboriginal peoples' use of songlines

## APPROACHES TO UNDERSTANDING LEARNING

### Classical conditioning

This is a process of learning based on the **repeated association** between **two stimuli** that is said to have occurred when a particular stimulus consistently produces a response that it **did not previously produce**.

It is important to recognize classical conditioning as a **three-phase process**, and to be able to identify what occurs before conditioning, during conditioning, and after conditioning with respect to the different elements.

#### Elements of classical conditioning

##### **Unconditioned response (UCR)**

A response that occurs **automatically** when the UCS is presented. The UCR is a reflexive response and one that does not require conditioning.

##### **Unconditioned stimulus (UCS)**

Any stimulus that consistently produces a particular automatic/reflexive response. It elicits the UCR without any conditioning; i.e. the stimulus **naturally** produces the UCR.

##### **Conditioned response (CR)**

A behaviour that is identical to that of the UCR but is caused by the conditioned stimulus instead of the UCS. This only occurs **after conditioning** has taken place.

### Conditioned stimulus (CS)

The stimulus that is “neutral” at the start of conditioning and does not elicit any response until after conditioning has taken place. It produces the CR after **repeated association** with the UCS.

### Neutral stimulus (NS)

A stimulus which does not elicit an unconditioned response, it is one that needs to be conditioned for it to produce a response. The **neutral stimulus becomes the conditioned stimulus**; therefore, they essentially refer to the same thing, just at different stages of the learning process (NS before conditioning, CS after conditioning). Note: NS is usually not regarded as one of the four “key” elements, but it’s still an element nonetheless.

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### Quick Tips

If it has ‘U’ in front, it must be a natural stimulus or response. The NS and CS should be the same, except one elicits a response (CS) and the other does not (NS).

The UCR and CR should be the same response, however the stimulus that triggers it should be different. Ensure you describe the origin of the response, otherwise the UCR and CR are exactly the same, when in reality there is a **clear difference**.

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**Exam Tip:** Psychology examiners are big on getting students to use “the language of classical conditioning”; this basically means using each of the elements in your response and other words specific to classical conditioning (e.g. acquisition, extinction, conditioning, etc). Make sure you have a good grasp on what each term means because without a good base understanding you won’t be able to use the terminology appropriately.

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**Typical Traps:** As alluded to in the tips above, the origin (i.e. the stimulus) that causes the response in both the UCR and CR **must** be described when you identify the UCR and CR. Otherwise they’re exactly the same and VCAA assessors will award you no marks for both!

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### Facts about classical conditioning

- DURING conditioning an association is made between the NS and UCS.
- There must be multiple pairings for the CR to be elicited.
- The CS should be presented approximately 0.5 seconds **before** the UCS.
- Learning is said to have taken place if the conditioned response occurs to the sole presentation of the CS (without the presentation of the UCS)

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**Exam Tip:** When you first start learning this topic it can be quite daunting with all this new terminology, but if you keep reading the explanations and look at a few different case studies, you should be fine. Nag your teacher for worksheets for you to practice because in most VCAA exams you’ll need to determine each of the elements to a unique case study, so doing plenty of different ones will benefit you greatly.

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Ivan Pavlov's experiment:

In the 1920s, Pavlov completed a world-famous experiment on classical conditioning using dogs. The dogs were individually restrained in a harness in a specially designed apparatus placed in an isolated, soundproofed room. This apparatus enabled the mechanical positioning of meat powder directly in the mouth of the canines, or in a small bowl nearby without any human intervention.

A surgically attached tube was inserted in the dogs' cheeks, which drained their saliva for measurement by the experimenters. In the baseline stage, the dogs were initially presented with a neutral stimulus (**NS**) – the sound of a bell – which elicited no response.

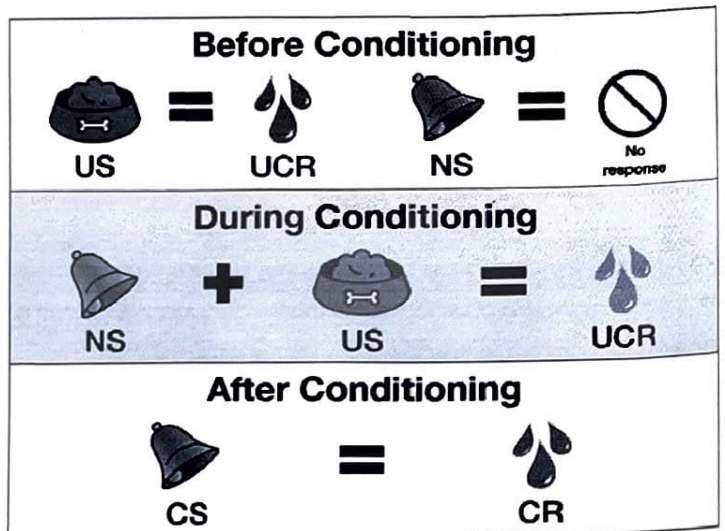
During the acquisition stage of conditioning, the bell was immediately sounded before the dog received the meat powder (**UCS**), which naturally led to salivation (**UCR**). Several trials were performed, in which the bell and the food were associated. As a result of their contiguity in time and space, the acquisition stage was completed. The bell then became the conditioned stimulus (**CS**), which led to a conditioned response (**CR**).

**UCR** – Salivating in response to the meat powder.

**UCS** – Meat powder.

**CR** – Salivating in response to the bell.

**CS** – The bell.



Learning is one of the most commonly examined topics and has been for many years now. Take this question from the 2021 VCAA exam:

**Question 2 (13 marks)**

Matilda takes her new pet dog, Biscuit, for a walk along the same route every day. Children often stop Matilda so they can pat Biscuit.

- c. When Matilda takes Biscuit for their daily walk, they pass a house with a dog that barks. Biscuit becomes extremely excited and barks in response. After many months, Biscuit becomes excited and barks when they get near the house, even before Biscuit hears or sees the dog.
- i. Using the language of classical conditioning, outline the three-phase process of how Biscuit learnt to get excited and bark in response.

3 marks

Sometimes, it is difficult to know how much information to include in your response. However, examiners leave a few clues in the question to help you out.

- **Command term:** this is what the questioning is directing, or “commanding”, you to do. In this case, the command term is “**outline**”.
  - Different command terms require different responses – e.g., “identify” or “state” require quick, brief descriptions, whereas “explain” and “justify” requires longer answers that touch on a key process of some sort.
- **Mark allocation:** a general rule of thumb is that the number of marks refers to the number of key points to include in your answer.

This question is worth 3 marks and examiners broke this down into the three-phase process of classical conditioning (before conditioning, during conditioning, after conditioning). Therefore, explanation of 1 key phase = 1 mark. However, like other questions on the psychology exam, you must relate your response back to the scenario, so explaining the key elements in relation to Biscuit was essential.

E.g., Initially the sight of the *house* (NS) provided no response.”

Most importantly, to gain full marks, students needed to explain what examiners called the *critical mechanism* of classical conditioning – repeatedly pairing and associating a neutral stimulus (NS) with an unconditioned stimulus (UCS) and unconditioned response (UCR), making the neutral stimulus turn into a conditioned stimulus (CS) that produces the conditioned response (CR) on its own (similar to the unconditioned response but just a different stimulus!).

## Operant conditioning

**Learning in which behaviour becomes controlled by its consequences is called operant conditioning.** Think of anytime when you’ve had a consequence for completing some action/behaviour - that consequence would have shaped your future behaviour. So, as you can tell, operant conditioning is constantly at work in our daily lives; almost every day, you’ll have dozens of experiences with this form of learning.

Three phase (A-B-C) model

“*Antecedent* → *Behaviour* → *Consequence*”

The **Antecedent** is the **environment** that precedes the response. This does not necessarily mean geographic environment, but rather the setting or situation that the learner needs to be presented with in order to produce a response.

*Example:* in order to teach a dog how to shake, the owner needs to hold out their hand and say “shake”. This is the ‘environment’ that the dog can act upon.

The **Behaviour** is the **action** that has an effect on the environment.

*Example:* dog lifting up its paw to shake the owner’s hand.

The **Consequence** is the **stimulus** or event that follows the response.

*Example:* owner giving the dog a bone.

**FAQ** In some textbooks, this can be referred to as the SRC “Stimulus □ Response □ Consequence” model, however your exam will use the terminology of A-B-C as this is what is specified in the study design.

In the case of a puzzle box:

- **A** = the actual puzzle box.
- **B** = the sequence of movements needed to open the door.
- **C** = escaping and getting the reward (the fish).

In the case of the Skinner box:

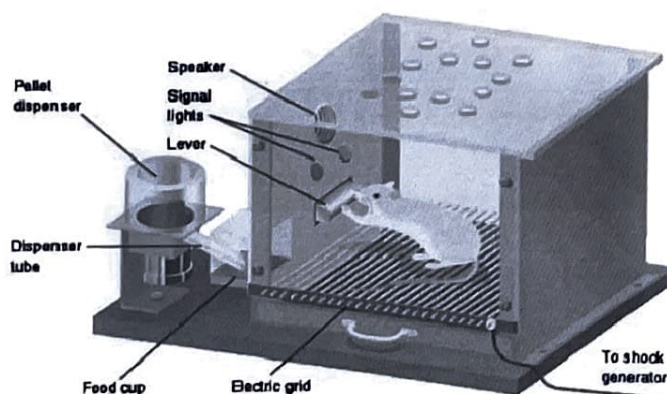
- **A** = the actual Skinner box.
- **B** = pressing the lever.
- **C** = getting the food pellet or removing the electric shock.

Skinner's experiments (The Skinner box)

B.F. Skinner was the father of operant conditioning; he named it Operant Conditioning because in this type of learning, **behaviour operates on the surrounding environment**.

**‘Operant’** in relation to operant conditioning refers to **an organism’s response or behaviour that acts on the environment and leads to some sort of outcome**.

His apparatus, ‘The Skinner box’, was a chamber in which an animal (usually a pigeon or hungry rat) learned to repeat certain behaviours. The box was capable of giving **positive reinforcement**; e.g. a food pellet or water was given whenever the rat pressed the lever. It was also capable of **negative reinforcement**; e.g. when the grid floor produced a mild electric shock, which could be turned off if the rat pressed the lever. A recording instrument then measured the frequency and speed with which the organism took to learn the desired behaviour inside the box.



## Reinforcement and punishment

It's important to ignore your common sense when it comes to looking at the words positive and negative. Positive does not always mean good, and negative does not always mean bad; however, reinforcement is **good** while punishment is **bad**.

### Reinforcement

Both forms of reinforcement involve a **pleasant** consequence overall and an **increase in the likelihood of a response occurring again**.

- **Positive reinforcement**

Occurs with the **application of a pleasant stimulus**. This produces an **increase** in the strength, likelihood or frequency of a response. This is probably the easiest term to get your head around out of all three. You've probably already been exposed to countless moments where you've been positively reinforced or you've seen someone else receiving positive reinforcement.

Common examples include getting an A+ after studying hard for your psychology exam, the class clown getting plenty of attention because they call out in class, receiving praise from your parents for reading, and a dog getting a pat when it sits on command.



- **Negative reinforcement:**

Occurs with the **removal of an unpleasant stimulus**. This produces an **increase** in the strength, likelihood, or frequency of a response. This is a positive outcome, as you want to get rid of unpleasant stimuli in your environment.

Common examples include taking a Panadol to get rid of a headache, carrying an umbrella with you to avoid getting wet, looking away from the screen when watching a scary movie, and sticking to the speed limit to avoid getting a speeding ticket.



## Punishment

Both forms of punishment involve an **unpleasant** consequence overall and a **decrease in the likelihood of a response occurring again**.

- **Positive punishment**

Occurs with the **application of an unpleasant stimulus**. This produces a **decrease** in the strength, likelihood, or frequency of a response.

Common examples include receiving a detention for coming late to class, getting a smack for misbehaving, a parking inspector writing you a ticket for parking in the wrong spot and getting scratched when you try to stroke a cat.



- **Negative punishment (response cost)**

Occurs with the **removal of a pleasant stimulus**. This produces a **decrease** in the strength, likelihood, or frequency of a response. It is sometimes referred to as response cost because it's what the response "costs" the person when they perform the undesirable action.

Common examples include getting your mobile confiscated at school for texting in class, your parents taking away your Xbox for teasing your sibling, losing your license for driving under the influence of alcohol, and your girlfriend not talking to you for treating her badly.



Summary:

- **Positive** means you're applying something, whilst **negative** means you're removing something.
- **Reinforcement** increases behaviour while **punishment** decreases behaviour.
- NR and PP involve the removal/application (respectively) of an unpleasant stimulus; PR and NP involve the application/removal (respectively) of a pleasant stimulus.

*If you remember the first two rules then you shouldn't need to remember this one – just use your common sense to work out the stimulus.*



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**Exam Tip:** In your exam it is most likely they will use the term '**response cost**' for negative punishment and just '**punishment**' for positive punishment.

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Factors affecting the effectiveness of reinforcement and punishment

- **Order of presentation:** Reinforcement and punishment must occur **AFTER** the behaviour.
- **Timing:** Both punishment and reinforcement are most effective when given **immediately** after the behaviour has occurred. This ensures that the organism associates the response with the reinforcer or punisher, without interference from other factors during the time delay. Presentation should also be **consistent**, i.e. the punishment must be given each time the undesired behaviour is performed.
- **Appropriateness:** For any stimulus to be a reinforcer, it must provide a pleasing or satisfying consequence for its **recipient**. If the recipient does not value the reinforcer the process will be ineffective. For any stimulus to be a punisher it must provide a consequence that is unpleasant and therefore is likely to decrease the likelihood of the undesirable behaviour occurring in the future.

Disadvantages of using punishment

- The punishment is sometimes **not harsh enough** to weaken the response.
- No alternative positive ways of behaving are provided in punishment.
- It may lead to "**avoidance of getting caught**" behaviour
- **Attention** from the punisher may be positively reinforcing the bad behaviour.
- It may lead to more aggressive behaviour/retaliation.
- The punishment will only be effective if administered soon after the response.
- It may lead to a **dislike or fear** of the punisher.

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Learning is one of the most commonly examined topics and has been for many years now. Take this question from the 2020 VCAA exam:

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**Question 6 (8 marks)**

When she turned four, Maxine received a medium-sized red box out of which popped a clown figure making a loud noise. When the box opened, Maxine ran away from it, towards her parents, screaming in fear. Her parents comforted her by playing with her. As a teenager, Maxine still runs away whenever she sees a similar box and her parents continue to comfort her. Maxine's parents have decided to consult a psychologist with Maxine to try to manage her phobia.

- a. In terms of operant conditioning, outline how Maxine's parents' response could be considered to be perpetuating her phobia of red boxes.

3 marks

The examination report noted that this question was answered poorly by students. Examiners were looking for three main components in possible answers:

- correctly identifying the **consequence** in this scenario
- correctly identifying the **behaviour** which is perpetuated by the consequence
- its relation to the scenario between Maxine and the red box.

The question specified to answer “in terms of operant conditioning”. Therefore, students were required to make reference to the behaviour and specific type of consequence in the scenario.

Students were also required to relate it back to the scenario. The psychology exam is all about application! Examiners don't want to see that you can recite a textbook, but rather how you take the concepts learnt in the course and relate them to real-life scenarios. This can be shown in different ways – using the names and events in the scenario, using personal pronouns (he/his, she/her) and thinking about the possibilities of the hypothetical situation.

Taking these points into consideration, a possible answer might have looked like this:

“Maxine's parents positively reinforced Maxine's avoidance of the red pox by playing with her and comforting her (something Maxine wants). This reward will increase the likelihood that Maxine will continue to avoid similar red boxes into the future”

In this response, we can see the name of the consequence (“positive reinforcement”), a description of the consequence (“reward will increase the likelihood...”) and its relation to the scenario (Maxine will continue to avoid...red box).

## Observational learning

Observational learning is a form of **social learning** which occurs through watching the behaviour of others, then imitating their actions accordingly. The person carrying out the behaviour is called the **model**, while the person watching is usually called the learner or the **observer**.

Factors influencing the likelihood of a person imitating a model's behaviour include:

- whether the model was reinforced or punished for their behaviour
- characteristics of the model
- whether the learner lacks self-esteem, since these learners with low confidence are more likely to imitate a model

## Elements of observational learning

**Attention:** Refers to the learner actively **observing** the model's behaviour.

**E.g.** a student actively observing their food technology teacher cooking a stir-fry.

**Retention:** Occurs when the learner stores a **mental representation (memory)** of the observed behaviour.

**E.g.** a student must store a mental representation of the actions that their teacher carried out to cook the stir-fry.

**Reproduction:** Refers to whether the learner is **physically and mentally capable** of carrying out the observed behaviour.

**E.g.** a young child would probably not be mentally prepared to mimic their older sibling solving a complex mathematical equation. A short person is not physically capable of reproducing the behaviour of a slam-dunk even if they've observed it and remembered the steps needed to perform the slam-dunk.

**Motivation:** Refers to the **desire** to perform the model's behaviour.

**E.g.** a student must have the desire **to perform** the task of cooking the stir-fry.

**Reinforcement:** Occurs when the learner receives a **positive outcome** for reproducing the behaviour, which increases the likelihood of repeating such behaviour.

**E.g.** when the student cooks the stir-fry, their teacher should praise them to encourage the student to cook again.

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**MNEMONIC: All Rude Rodents Make Raspberries.**

Or **AARMR** (Like a pirate!)

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## Albert Bandura's work

Albert Bandura is famous for conducting numerous experiments with young children in relation to modelling behaviour. Although his experiments (1961, 1963a, 1963b) have been taken off the study design, I think a basic understanding of them would still be useful for your exam preparation. However, it is still relevant that you understand Bandura's "**Social Learning Theory**" in regards to observational learning.

### Social learning theory

Bandura's social learning theory describes learning by **combining operant conditioning and observational learning processes**, while taking into account the environment in which these processes occur. The theory suggests that **learning takes place socially and vicariously through observing the actions and beliefs of others, as well as the consequences of those actions and beliefs.**

Social learning theory advances our understanding of how people learn by demonstrating that humans use their powers of observation and thought to interpret their experiences, and those of others when deciding how to act.

**Vicarious reinforcement** is one instance in which we are conditioned through observing someone else being reinforced. For example, a toddler may learn to use the bathroom on his own as he sees his older brother do the same and get rewarded for it.



### 1965 Bobo Doll experiment

This study investigated the imitation of aggressive behaviour in children. Young children were divided into three groups, each of which watched a different short film displaying an adult playing aggressively with a Bobo doll.

#### **Experimental conditions:**

- In condition 1, the adults in the video were reinforced with rewards after performing the aggressive actions.
- In condition 2, the adults in the video were punished with scolding and spanking from another adult after performing the aggressive actions.
- In condition 3, the adults in the video were given no consequences after performing the aggressive actions.

After each film, the children were allowed to play in a room with a bobo doll. Half of these children were given rewards for carrying out aggressive behaviours, and the other half were neither rewarded nor punished.

### Results and implications

Children in the model punished (condition 2) performed **significantly fewer aggressive acts** than the rewarded and no consequences conditions. Furthermore, when the children were directly rewarded for the aggressive behaviours towards the doll, there was an increase in the number of aggressive acts. Therefore, **the children had all learned the behaviours equally, but whether they displayed them or not was affected by direct reinforcement and/or vicarious reinforcement**



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### Exam Tip

The 1965 Bobo doll experiment was on the 2005-2010 study design, but not the 2011-2012 study design. However, it provides a better summary of the key findings than the 1961, 1963a, and 1963b studies from the 2011-2012 study design.

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### Typical Traps

You must be **very** careful when discussing these elements to ensure you discuss them in terms of “performing” the behaviour, and NOT “learning” the behaviour once you have passed the initial learning stages of ‘attention’ and ‘retention’. E.g. In an exam if it asked for a definition of motivation and you wrote “the desire **to learn** the model’s behaviour” you would get zero marks. You must write **to perform**.

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### FAQ

Depending on what textbook or source you read, some say motivation and reinforcement are separate stages while others say they’re just one stage. VCAA exams typically have them separate so you should learn them as two separate concepts, however they are closely linked and rely on one another so you need to be aware of this connection.

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## Multimodal Systems of Knowledge

**Multimodal systems of learning** refer to integrating many different types of activities such as incorporating visual, auditory and kinaesthetic learning to enhance knowledge. **Aboriginal and Torres Strait Islander Peoples** have a longstanding cultural history that is continued through generations of passed on knowledge. This knowledge involves multimodal learning systems that are strongly connected to **Country**.

Aboriginal and Torres Strait Islander Peoples learn through relationships with others in multimodal ways. The knowledge of Country is communicated through generations by the use of song, dance, art, story and language. These various teaching methods are often used in combination with each other, allowing for enhanced learning to occur. Aboriginal Elders communicate this information piece by piece to the next generation, where more detail is given to Aboriginal Peoples as they get older.

This knowledge is deeply connected to Country. The information communicated is based upon Ancestral knowledge so that spirituality and culture can be continued through future generations. Knowledge, including spiritual stories, sacred locations and ways of surviving off the land are passed on to Aboriginal Youth.

# THE PSYCHOBIOLOGICAL PROCESS OF MEMORY

## Memory

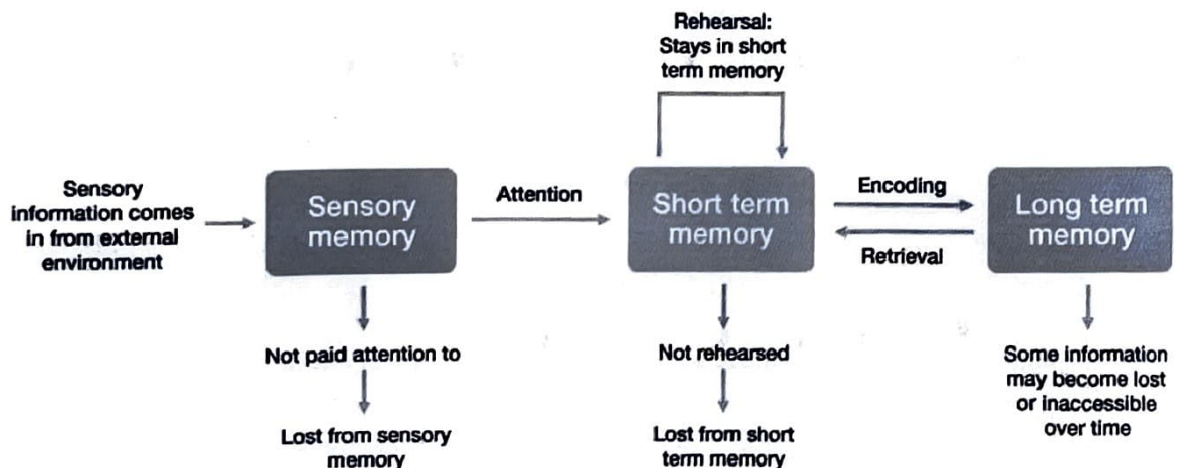
**Memory** can be defined as “an active information-processing system that receives, organises, stores, and recovers information.” It comprises three sequential processes: encoding, storage and retrieval.

- **Encoding** refers to the process of converting information into a form that is suitable for storage in memory.
- **Storage** refers to the retention of information in memory over time.
- **Retrieval** involves locating and recovering information that is stored in memory.

**Learning** is defined as “a relatively permanent change in behaviour that occurs as a result of past experience”.

## Atkinson-Shiffrin model

In the 1960s, Richard Atkinson and Richard Shiffrin proposed a **three-register model** of human memory, comprising sensory memory, short-term memory (STM) and long-term memory (LTM).



### Sensory memory

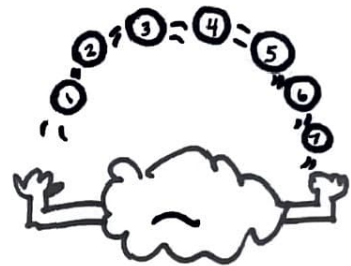
Relates to the memory in our **sense organs**. We have a sensory register for each of our five senses; the information held in sensory memory has not yet entered our conscious awareness and may never do so unless it is attended to.

- **Iconic Memory** refers to our visual sensory memory system. Iconic memory lasts for approximately **0.2-0.4 seconds**. This explains how we are able to see moving pictures from a series of still frames: we store the image of each still shot just long enough for it to be instantly replaced by the next frame.
- **Echoic Memory** refers to our auditory sensory memory system. Echoic memory lasts for approximately **3-4 seconds**.
  - 3-4 seconds is long enough for us to be able to link impressions of sound with the next syllable or word we hear, so when we pay attention to them we are able to make sense of the sounds as a word.
  - If the duration were longer, the words we hear would start to overlap too much and be jumbled up.

### Short term memory (STM)

Often referred to as **working memory** because it is the location of mental manipulation of information. It may use information from sensory memory or information that has been retrieved from LTM. Information in STM may be discarded or displaced; it may be retained through rehearsal; it may be encoded and thus transferred to LTM.

- The **capacity** of STM is believed to be **7 + - 2 items**. When this capacity has been reached, new information can only be held in STM by displacing existing information.
- The **duration** of STM is believed to be approximately **18-20 seconds**, after this time the information has usually been lost.



The **capacity** of STM can be enhanced through **chunking**. This involves grouping together bits of information so that they can be remembered as a group or 'chunk'. It is often easiest to chunk in twos or threes. Phone numbers are a prime example of chunking; e.g. 5555 689 320 is easier to remember than 5555689320 because the number has been grouped into 3 units rather than 10, falling within the capacity of STM.



The **duration** of STM can be enhanced through **maintenance rehearsal**. This involves keeping the information in STM through simple rote repetition of the information. As long as we are not interrupted during the process, we can keep information in STM almost indefinitely. However, this method of rehearsal is inefficient because whilst it can keep information in short term memory briefly, it does not encode information well since no meaning is added to the information. As such, it is unlikely information will be

transferred to LTM.

**E.g.** Repeating a definition over and over again in your head ("just keep swimming...")

Another rehearsal process, known as **elaborative rehearsal**, differs from maintenance rehearsal in that it gives **added meaning** to information and attempts to link it to other pieces of information already held in LTM. This involves processing the information at a

deeper level and, thus, information is much more likely to be encoded and retained in LTM.

**E.g.** creating mnemonics/acronyms for lists of terms, or thinking of personal examples from your life to help better understand concepts.

### Long term memory (LTM)

Refers to the vast storage place of information that is **highly organised** and has been transferred from STM. Even though sometimes it may seem that you have so much that nothing else could fit inside your memory, LTM is believed to be **virtually unlimited**. Furthermore, memories held in LTM are said to be **relatively permanent**.

LTM is subdivided into several forms, with each storing specific types of information.

**Procedural (implicit) memory** refers to the memory of how to do something. It is usually formed after practice. Procedural memory is sometimes referred to as **implicit memory** because the information can be retrieved through performance rather than intentional conscious recall. An example of a procedural memory is how to tie your shoelaces.

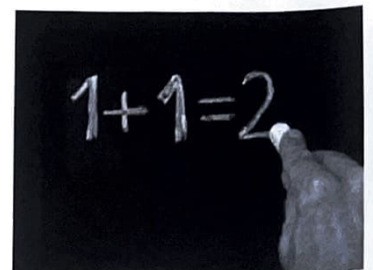


**Declarative (explicit) memory** refers to the memories of facts and events. Declarative memory is sometimes referred to as explicit memory because it generally requires conscious, intentional retrieval of information. Declarative memory is further subdivided into episodic and semantic memory.

- **Episodic memory** refers to personalised memories of events and experiences. Episodic memories are of a personal nature (they are related to your life experiences) and are usually set in a particular context (e.g. date, time, location). Examples of episodic memory include your 18<sup>th</sup> birthday, and the moment you felt happiest.



- **Semantic memory** refers to memories of facts and knowledge that do not depend on a particular place or time, but are just simply facts. Examples of semantic memory include knowing that the capital of France is Paris, and that  $4 \times 5 = 20$ .



### Summary of memory stores

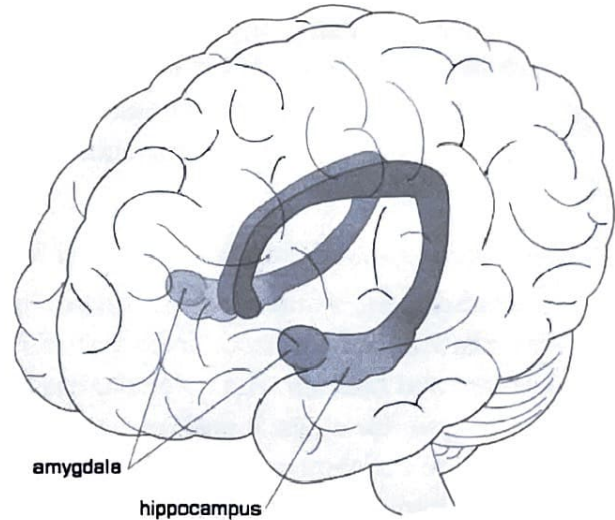
Sensory memory	Short term memory	Long term memory
----------------	-------------------	------------------



<b>Capacity</b>	Virtually unlimited	7 + - 2 items	Virtually unlimited
<b>Duration</b>	Iconic: 0.2 – 0.4s Echoic: 3 – 4s	18 – 20 seconds	Relatively permanent

## Key memory structures

Over our lifetime, we learn a countless number of behaviours and remember an inconceivable amount of information, which will involve different areas of the brain. Studies have shown that the nature of what is being remembered affects which brain areas are activated. Therefore, memory is not confined to a single brain area, but rather the interactions between many regions of the brain. Some of the brain areas thought to be involved in various types of learning and memory are the cerebellum, cerebral cortex (neocortex), basal ganglia, hippocampus, and amygdala.



### Hippocampus

The hippocampus is connected directly to the frontal lobe and amygdala. It is essential for the formation of **new declarative (explicit) memories**; however, it is not the storage site for established long-term memories. The hippocampus is also involved in establishing the background or context for each new memory, such as the location, situation, and memory for places. The process of **consolidation** of declarative memory (semantic and episodic) takes place in the hippocampus. The hippocampus transfers declarative information to other relevant parts of the cortex for permanent storage as long-term memory.

### Amygdala

The amygdala is located beneath the cortex of the temporal lobe. Its primary role in memory is the **formation of long-term implicit memory**, including emotional memories, such as recognising emotions in faces, procedural or skill learning, and stimulus-response conditioning (e.g. learnt fears). It regulates emotions such as fear and aggression, and plays a more general role in the formation of emotional memory. The amygdala also has an important role because the **emotions it regulates can enhance the memorability of an event**.

### Neocortex

The **neocortex** makes up the majority of the cerebral cortex and is involved in higher order cognitive functions. Its role in memory is to store both episodic and semantic

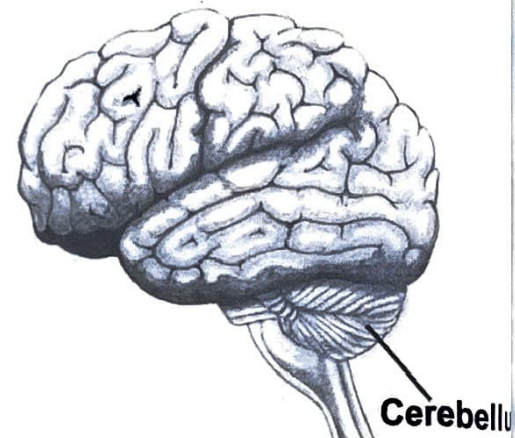
long-term explicit memories. The hippocampus transfers consolidated information to the neocortex, where it is stored for future retrieval.

### Basal Ganglia

The **basal ganglia** are a group of structures that are located near the centre of the brain. It is responsible for voluntary motor control and motor learning. In terms of memory, the basal ganglia have a role in forming long-term implicit memories, specifically motor skills that can form as procedural memories. For example, it will play a role in forming the procedural memory of how to ride a bike as it involves learnt motor movements.

### Cerebellum

The **cerebellum** is a structure attached to the rear of the brainstem that helps coordinate voluntary movement and balance. The cerebellum is necessary for learning **motor skills**; it enables sequences of movement to be learnt so different movements can be carried out simultaneously. Therefore, it is recognized as being very important in the processing of **procedural (implicit) memories**.



### Medial temporal lobe

The medial temporal lobe refers to the inner surface area towards the middle of the temporal lobe that *includes* the hippocampus, amygdala, and other cortical tissue. One famous case demonstrated the critical importance of the medial temporal lobe structures in memory. H.M. was a patient with severe epilepsy, so surgeons decided to remove the medial temporal lobe from each cerebral hemisphere. His personality remained mostly unchanged and many of his cognitive functions were normal. However, the surgery resulted in severe anterograde amnesia. He was incapable of forming new long-term episodic or semantic memories. H.M.'s short-term memory (STM) system was intact, which suggests that STM is processed in different parts of the brain to long-term memory.

## Episodic & Semantic Memory in Retrieval & Imagination

Retrieving autobiographical events:

Episodic and semantic memory help to retrieve **autobiographical events** and construct our **imagination** of the future. When recalling an event that has happened in the past, semantic memory is responsible for storage and allowing retrieval of the factual and general knowledge information, such as dates, times and location.

However, episodic memory is involved in storing the personalised information obtained from one's own perception of the event, such as their thoughts and emotions.

For example, if an individual is recalling their first day of Year 7, their semantic memory will allow for retrieval of what classroom they were in, whereas episodic memory is responsible for recalling that they were nervous and thought their uniform was too big.

Constructing possible imagined futures:

This is also the case when imagining the future. When this occurs, semantic memory will allow for an individual to imagine general knowledge aspects of their future, whereas episodic memory allows for imagining personal opinions they may have. Both types of memory help to imagine a potential future event by basing it on previously stored experiences in episodic and semantic memory.

For example, when imagining the first day of university, semantic memory may help to picture what the classroom will look like based on your past experiences of different classrooms, and episodic memories may help to imagine how you would be feeling, based on other first day experiences.

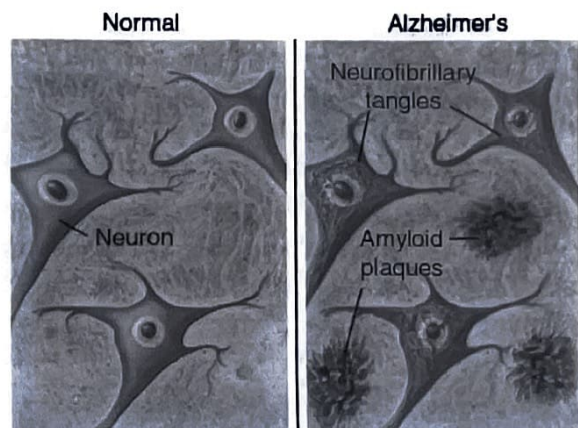
## Alzheimer's disease

Alzheimer's is a disease involving the **gradual widespread degeneration of brain cells**, resulting in a progressively severe deterioration of mental ability, personal skills, and behaviour. It is a type of **dementia**. Its effects are progressive, and it is considered an incurable disorder that primarily impairs memory and other cognitive functions.

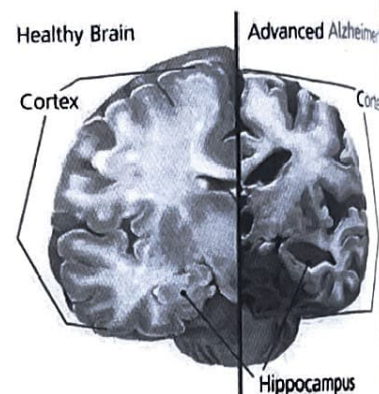
In the early stages of Alzheimer's disease, patients begin to display a decline in their STM and difficulty forming new memories. Overtime, episodic and semantic memories begin to be affected and become difficult to retrieve by the patient. Particularly, retrieval of autobiographical events becomes more difficult.

Alzheimer's disease may also cause difficulty in constructing imagined futures as episodic and semantic memory are impacted. Both types of memory are used to form the basis of an imagined potential event through drawing on past experiences to help in picturing future experiences. However, with their being a difficulty to retrieve episodic and semantic memories, there will be difficulty in using them for imagining possible futures.

It occurs most frequently in old age (about 1 in 25 over the age of 60 years). There is currently no single or simple diagnostic test for Alzheimer's disease; an accurate diagnosis can only be made after death (**post-mortem**) when an **autopsy** involving microscopic examination of brain tissue can be conducted. Neuroimaging techniques, such as magnetic resonance imaging (MRI) and positron emission tomography (PET)



can be used to assess the extent of damage caused by the disease and can identify brain tissue shrinkage.



### Key brain lesions identified through post-mortem research:

- Presence of **amyloid plaques** (these are protein deposits that build up and form on axon terminals, affecting neural transmission).
- Build-up of **neurofibrillary tangles** (twisted fibre of proteins within neurons, which interrupt neural communication and transmission).
- Lower levels of a key neurotransmitter involved in memory (**acetylcholine**), affecting the strength of neural messages being sent across the synapse.
- Changes usually **begin in the hippocampus** and other areas in the temporal lobe, which then **spread to the frontal lobe and the prefrontal cortex**. They eventually also spread to more widespread areas.
- There is a **degeneration** of neurons in the brain. These neurons become damaged, which leads to **brain tissue shrinkage** and brain tissue death. Particularly, shrinkage of the hippocampus is a common sign of Alzheimer's that inhibits the formation of new long-term memories.

## Aphantasia

**Aphantasia** is the inability to visualise or create mental images in the mind (lack mental imagery). People with aphantasia are unable to picture objects, people and future events. As those with aphantasia are unable to visualise, they will find great difficulty in creating imaginations of the future.

Aphantasics can still recall autobiographical memories and describe the event, however, they will be unable to visualise what had occurred. They often recall episodic memories by listing facts and general knowledge (semantic memories), such as what colour they were wearing or what day it was, rather than their personal perception of the event (episodic). Aphantasics often say that they can describe the concept of a memory but are not able to picture what it was like to experience the event. For example, an aphantasic may recall that they were at the snow and can describe what snow looks like, but they may be unable to specifically recall their own personal experience at the snow.

It is seen in **functional magnetic resonance imaging (fMRI)** scans of those with aphantasia that there is a significant decline in activity in the visual cortex of the brain in the occipital lobe.

## Mnemonic Devices

**Mnemonics** are memory devices that help to encode, store and retrieve information. They are used by linking newly learnt information to information previously stored in LTM so that encoding increases and retrieval is made easier. Mnemonics are used in **written and oral cultures**.

### **Mnemonics in Written Cultures**

- **Acronyms** are mnemonic devices where the first letter of each word is combined to form an abbreviated word. For example, long-term potentiation is LTP, and Kentucky Fried Chicken is KFC. When repeatedly used, acronyms can enhance memory as the information that needs to be encoded is shortened to a few letters. In doing so, the letters act as a **retrieval cue** that prompts the individual to recall what the letter stands for, thus increasing retrieval.
- **Acrostics** are mnemonic devices where each letter of a word or the first letter of each word in a sentence, represents another word or phrase. For example, **All Rude Rodents Make Raspberries** represents the five observational learning stages (**A**ttention, **R**etention, **R**eproduction, **M**otivation, **R**einforcement). This aids in memory as it enhances encoding and storage through linking the new information with previously stored information in a meaningful way. As a result, retrieval will now become easier due to the provided retrieval cues of the acrostic.
- **Method of Loci** is where a piece of information that needs to be stored is linked to a specific location that one is familiar with to aid in retrieval. For example, using different rooms in your house as a cue for a piece of information on psychology content. The kitchen may be linked to LTD content and the laundry may be attached to the CNS. The idea is that by following the sequence of locations in your head, each location will act as a **retrieval cue** for the information that was associated with that specific place. It is allowing for meaningful links to be made with new information and already stored information in LTM so that retrieval is made easier.

### **Mnemonics in Oral Cultures**

**Sung Narrative** can enhance encoding of memory through using rhythm and stories to present information. The song links the information needed to be stored together so that it can increase memorability in the future. The song doesn't necessarily have to be complex but can simply incorporate rhythm and tonal variations to present concepts. When repeatedly using sung narrative, the information can be better encoded and therefore easier to retrieve in the future. This is often used in oral cultures; including Aboriginal and Torres Strait Islander peoples.

### **Aboriginal Peoples' use of Songlines**

Aboriginal and Torres Strait Islander peoples use songlines to preserve cultural knowledge over generations to allow for connection between Indigenous peoples and Country. Songlines are a series of **sung narratives** attached to sacred sites and specific locations, therefore allowing for the strong connection to **Country**. Often, songlines incorporate dance, physical or imagined walkthroughs and art.

Aboriginal Peoples navigate through the land by using songlines in the correct sequence which contain information such as social expectations, locations of landmarks, plant identification, trading rules and the importance of the land. Songlines often communicate the experience and journey of **Indigenous Peoples' Ancestors** as they created Country. The art used alongside these songlines help to better represent the story being communicated, including the path through Country.

Songlines are similar to the method of loci, but they are not the same. Songlines use sung narrative, art and dance to relay knowledge at specific locations in Country. It forms a combined system of different mediums (song, dance, art) to continue the knowledge passed from generation to generation. This knowledge is deeply connected to Country.

Songlines are an effective **memory technique** as seen through Aboriginal Elders having large quantities of knowledge passed from Ancestors. There are many reasons for this. Songlines often incorporate art and movement, which increase **excitability** of neurons in the hippocampus, therefore enhancing consolidation. Stories within these songlines are often **vivid and creative**, meaning that neurons are more likely to increase activity when undergoing encoding, as neurons tend to be stimulated by interesting information rather than tedious information. As a result, the incorporation of this detail makes the information more memorable.

Because songlines are anchored to specific locations and are repeated often, the **hippocampus** will form **spatial associations** with that location and the information linked to it. This means that there will be linked neural pathways of the related knowledge to the location, therefore the location can act as a trigger or mnemonic to that memory.

## UNIT 4 | AOS 1 – HOW DOES SLEEP AFFECT MENTAL PROCESSES AND BEHAVIOUR?

### Key Concepts

**The demand for sleep:**

- Define sleep as a psychological construct as a naturally occurring altered state of consciousness (ASC)
- Distinguish between circadian rhythm (sleep-wake patterns) and ultradian rhythms (sleep stages)
- Describe NREM stages 1-3 and REM sleep
- Outline methods to measure physiological responses during asleep through ECG, EOG, EMG, sleep diaries and video monitoring
- Outline the differences in sleep across the lifespan
- Outline the role of the suprachiasmatic nucleus and melatonin in regulating sleep

**Importance of sleep to mental wellbeing:**

- Describe the effects of partial and full sleep deprivation on affective, behavioural and cognitive functioning
- Compare partial and full sleep deprivation to blood alcohol concentration readings
- Describe and distinguish between Delayed Sleep Phase Syndrome, Advanced Sleep Phase Disorder and shift work
- Explain how bright light therapy can be a treatment for circadian rhythm sleep disorders
- Outline how sleep hygiene can improve mental wellbeing
- Explain how zeitgebers can improve sleep-wake patterns
- Describe how to improve sleep-wake patterns with reference to daylight and blue light, temperature, and eating and drinking patterns

# THE DEMAND FOR SLEEP

## Characteristics of sleep

Sleep is a psychological construct defined as a regularly occurring **altered state of consciousness** that typically **occurs spontaneously** and is primarily characterised by a **loss of conscious awareness**.

As humans, our bodies follow a **circadian rhythm** that spans over approximately 24 hours and allows us to biologically detect when it is daytime and, therefore, when we need to be awake, and when it is night-time and we need to sleep. Our sleep-wake pattern is a circadian rhythm.

Within the circadian rhythm we also have what is known as an ultradian **rhythm** which is a rhythm that repeats a number of times throughout a day (or in this case, night). The specific ultradian rhythm we look at is more commonly recognized as our sleep cycle. This cycle lasts for approximately 90-120 minutes and repeats a number of times throughout the night. The NREM and REM stages are also ultradian rhythms, as they happen multiple times within 24 hours.

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### Characteristics of sleep

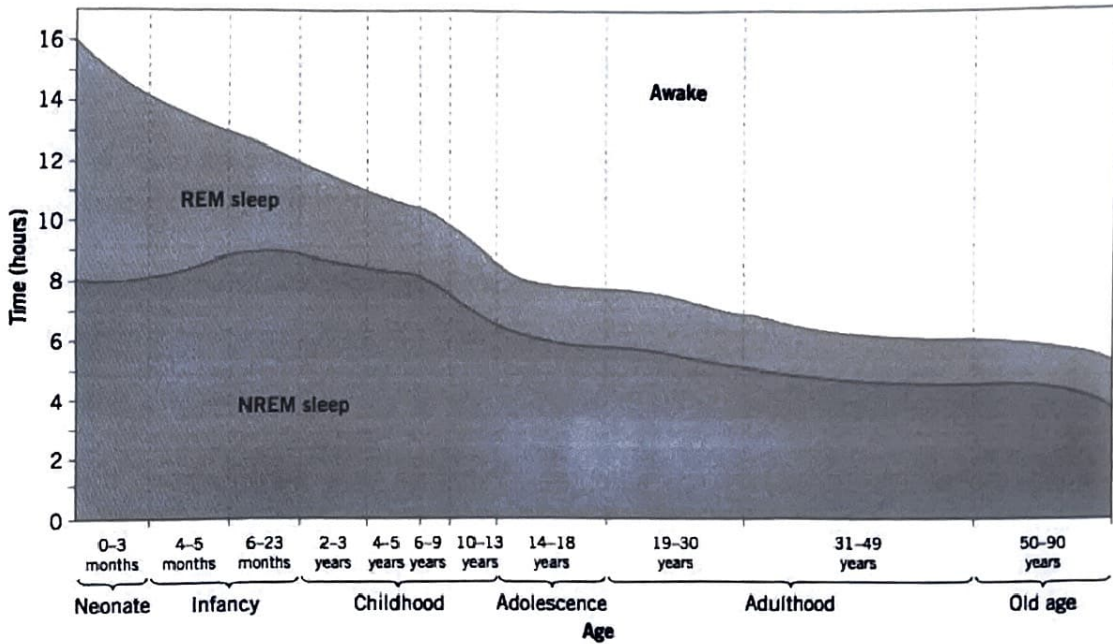
NREM sleep: Non-rapid eye movement sleep

REM sleep: Rapid eye movement sleep

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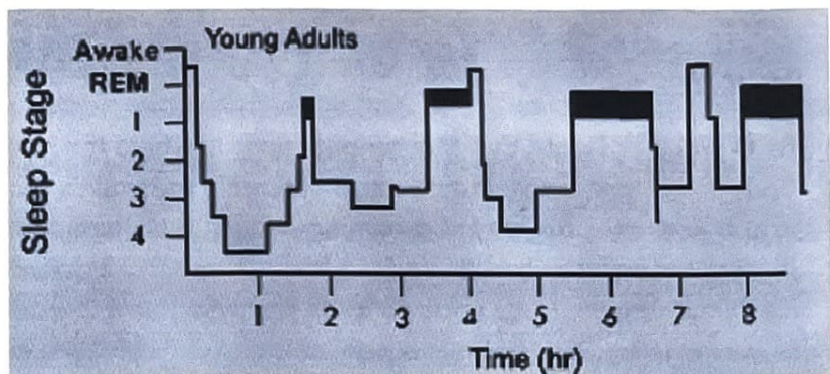
**NREM** sleep comprises **80%** of your sleep, while **REM** comprises about **20%**. **This does, however, vary according to your age.** As a person gets older, the amount of time they spend sleeping reduces. However, 80% NREM to 20% REM are the main percentages you should know for each category of sleep as they refer to the average (middle-aged) person.



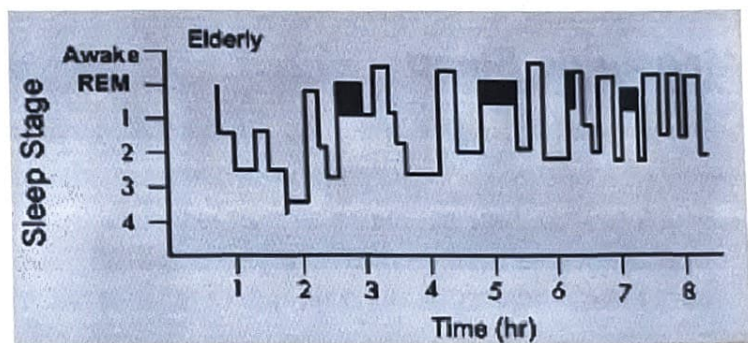


**As you age you sleep less;** infants sleep around 15-16 hours per day, while the elderly can sleep as little as 6 hours a day and still feel refreshed. They also tend to experience **more awakenings** than any other age group. Additionally, newborns tend to spend 50% of their sleep in REM, while most other older age groups only spend roughly 20% in the REM stage. If someone is very old (80+), they tend to rarely experience slow wave sleep (stage 3).

You have **more NREM at the start of your sleep**, then as the night goes on, there's less NREM and slightly more REM sleep. **Each sleep cycle lasts for about 90 minutes** and we usually have 5 per night.



**NOTE:** Stage 4 sleep is not assessable in the new Study Design, however, it is included in the diagrams to the left to explain the full sleep cycle.



A typical night involves going through the stages roughly in the following pattern:

1, 2, 3, 2, REM, 2, 3, 2, REM, 2, 3, 2, REM, 2, REM, 2, AWAKE.

**You go down through the stages of NREM, then go back up, then go into REM.** This repeats, and as the night progresses, you tend to not go into stage 3. That's where the greater periods of REM come in.

From looking at the following graphs, it's apparent that sleep patterns change markedly over the lifespan. There are key differences in the **amount of REM in comparison to NREM** (especially when comparing an infant to a middle-aged person), the number of awakenings (more apparent in the elderly) and a **large reduction in stage 3** (seen in the elderly).

### NREM Stages 1-3 and REM Sleep

**NREM stage 1** is typically the first sleep stage entered upon falling asleep. It is characterised by hypnic jerks (muscle spasms or twitches) and slowed down heartbeats and breathing activity. It is considered to be **light sleep**, where people are easily woken. NREM 1 is the shortest stage of sleep, generally lasting approximately **5-10 minutes**.

**NREM stage 2** continues from NREM stage one in slowing down heart rate, breathing and muscle movements. It also causes body temperature to decrease and eye movements to stop. It is still considered **light sleep** as people can be easily woken during this stage. NREM 2 lasts approximately **10-20 minutes**.

**NREM stage 3** is a transitional stage that marks the beginning of **deep sleep**. The body continues to relax further and becomes less responsive to external stimuli. This means an individual in NREM 3 is more difficult to be woken. This stage lasts for approximately **20-40 minutes**.

**REM sleep** or **Rapid Eye Movement sleep** is where the brain is the most active and body is the least active during sleep. Because the brain's activity is high in this stage, it is also where the majority of dreaming occurs. It is characterised by the eyeballs rapidly moving beneath the eyelids and is often referred to as **paradoxical sleep**. Paradoxical sleep is where the body appears to be paralysed as it is extremely inactive and still. However, internally, the brain is very active.

## Measuring Sleep

### Electro machines

The following three machines all start with "electro". Therefore, the **term electrical in any explanation of them is critical if you want full marks**. You will automatically be deducted a mark if you don't mention the word electrical, so don't forget it!

This is the only area in the study design that VCAA allows abbreviations. To make sure you don't forget the word electrical, you can abbreviate to EEG, EOG etc but when elaborating their function use the term "electrical".

There's a good way to remember how to start off each explanation of the three machines, and it's known as **DARE**:

**Detects                      Amplifies                      Records                      Electrical activity**

An **electroencephalograph (EEG)** detects, amplifies and records the electrical activity of the brain in the form of brain waves.

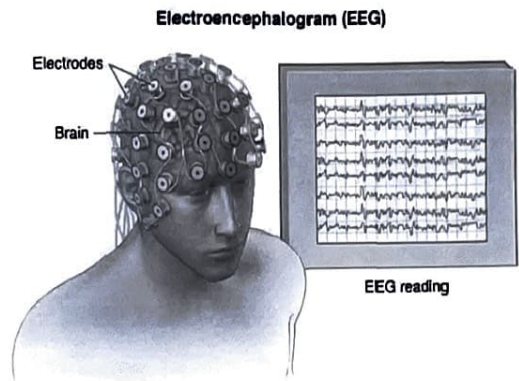
An **electromyograph (EMG)** detects, amplifies and records the electrical activity of the muscles in the body.

An **electro-oculogram (EOG)** detects, amplifies and records the electrical activity of the muscles surrounding the eyes, which control eye movements.

**Typical Traps**

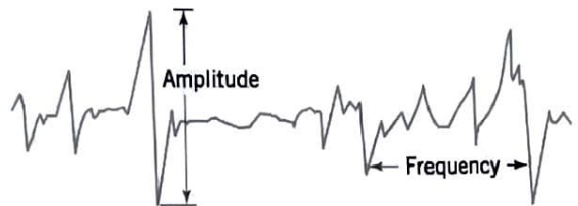
DO NOT ever say 'the muscles in the eye', this is wrong and you'll get zero marks if you write it. You must remember it's the muscles SURROUNDING the eye!

An **electroencephalograph (EEG)** is particularly important. Changes in brain wave activity can provide psychologists with information about a person's level of consciousness. This machine is best known for being useful in identifying various stages of sleep, although it can indicate an alcohol-induced state because brain wave patterns are lower in frequency and amplitude when intoxicated, since alcohol acts as a depressant on the nervous system.



When talking about brain waves you need to have two terms down pat. These are **frequency** and **amplitude**:

- **Frequency** refers to the **number** of brain waves.
- **Amplitude** refers to the **dilation factor** of the brain waves. This relates to **intensity**.



When in **NREM sleep**, brain waves are typically low frequency and high amplitude as the brain is less active. However, in **REM sleep**, brain waves are seen as high frequency, low amplitude as this is the stage where the brain is the most active.

High **frequency** = more alert                      low **frequency** = less alert.

High **amplitude** = less alert                      low **amplitude** = more alert.

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**Exam Tip:** When discussing the different brain waves in a short answer response, it is critical to be aware of the relevant frequencies and amplitudes. You would typically describe the frequency and amplitude briefly whenever you mention the different brain waves because it demonstrates your understanding of the link between frequency and amplitude, and the level of arousal.

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**NOTE:** The discussion of frequency and amplitude also applies to signals received from an EOG and EMG as well. High frequency and low amplitude = more activity, whilst low frequency and high amplitude = less activity.

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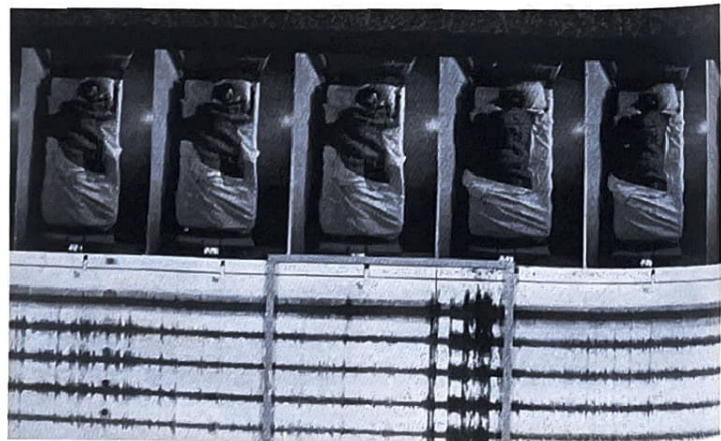
When using **electro-oculography**, high frequency and low amplitude activity will be observed during REM sleep as the eyes are rapidly moving in this stage of sleep. However, during NREM sleep, the eyes are less active, meaning that low frequency and high amplitude activity will be seen.

In an **electromyograph (EMG)**, high frequency and low amplitude activity will be observed more often during NREM sleep, typically when an individual has hypnic jerks in NREM stage 1. However, there are still low amounts of activity detected on the EMG. During REM sleep, there is extremely little amount of activity detected on the EMG, shown as low frequency and high amplitude. This is because REM is referred to as paradoxical sleep, which is where the body is very still.

## Video Monitoring and Sleep Diaries

### Video Monitoring

**Video Monitoring** involves video cameras recording **externally observable** physiological responses accompanying sleep. It is most often used when studying somebody with a sleep disorder to see their live reactions and certain behaviours, such as snoring, sleep talking, and sleep walking. It can be used to compare visual information with physiological measurements that have been recorded. It can also be used to make a crude distinction between REM sleep and NREM sleep, with the former showing very little, if any, movement.



## Sleep Diaries

**Self-reports** involve an account of a **person's own thoughts, feelings and experiences as collected in an interview, survey or questionnaire**. This includes **sleep diaries** (also called sleep logs), and questionnaires relating to sleep problems. A sleep diary involves an individual recording their sleep and waking time activities, usually over a period of several weeks. This usually involves recording the time they slept; the number, time and length of any awakenings during the sleep; the time of getting up; any substances that have been consumed, such as alcohol, caffeine, and medication; when the person had meals; any significant life events; and when they exercised.

Self-reports need to be interpreted with caution, as **data is subjective**. Subjective measures are open to human error and inaccuracies; therefore, it is recommended to also obtain objective data when determining a person's state of consciousness.

Another important aspect is whether the data is qualitative or quantitative:

- **Quantitative data** is measurable data, expressed in scores or numbers.
- **Qualitative data** is descriptive data, expressed in words or images.

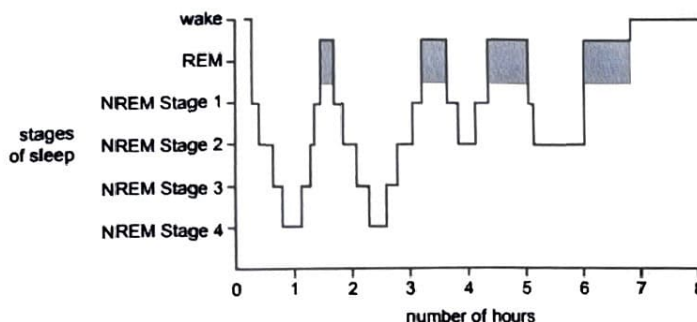
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**NOTE:** It is also good to remember that your core body temperature drops by approximately  $1^{\circ}\text{C}$  when you're asleep. Also, your heart rate can be quite erratic when you're dreaming (in REM sleep) and can speed up quite dramatically and suddenly.

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Sometimes, sleep cycles can be confusing. Take this question from the 2019 VCAA exam:

### Question 33

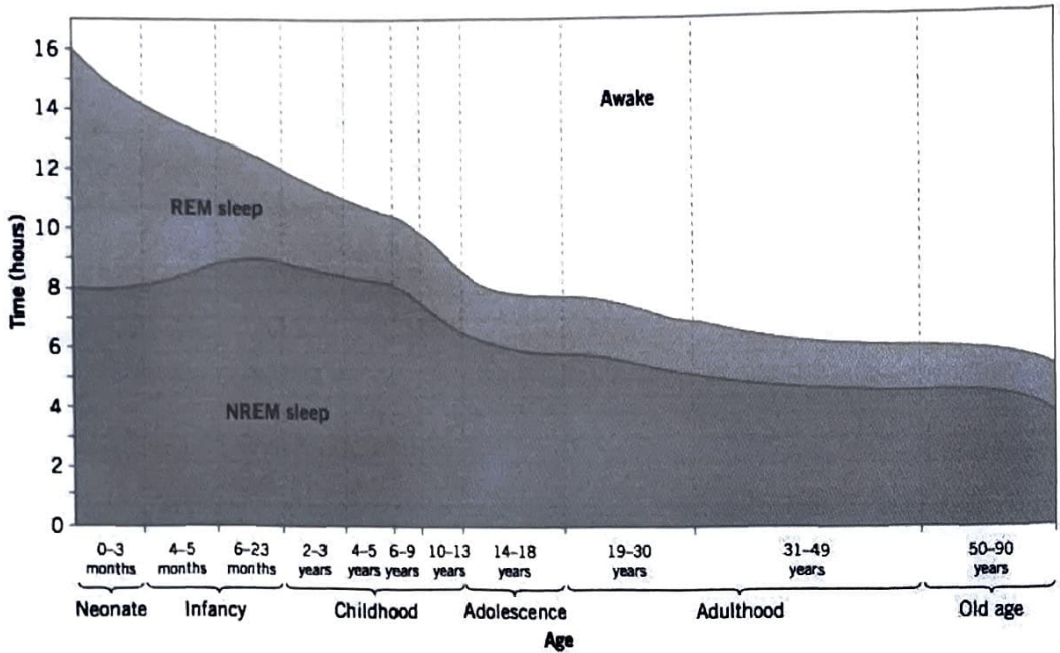


Dr Abdulla is a sleep researcher. He has collected data from four healthy participants: a child, an adolescent, an adult and an elderly person. Dr Abdulla forgot to label the hypnograms so he decided to try to identify them by considering the typical sleep patterns for each life stage.

The hypnogram shown above is likely to belong to which participant?

- the adolescent, because adolescents go to sleep later at night
- the adult, because adults have four to five sleep cycles per night
- the child, because children spend 20 per cent of their sleep in REM
- the elderly person, because elderly people wake frequently during the night

The only correct response is B. The other responses contain some inaccuracies either in the facts presented or their reference to Dr. Abdulla's hypnogram. The diagram on the next page shows this decreasing amount of sleep that occurs across the lifetime.



Nevertheless, this demonstrates the importance of reading the question *carefully* and highlighting the key words!

## Regulating Sleep

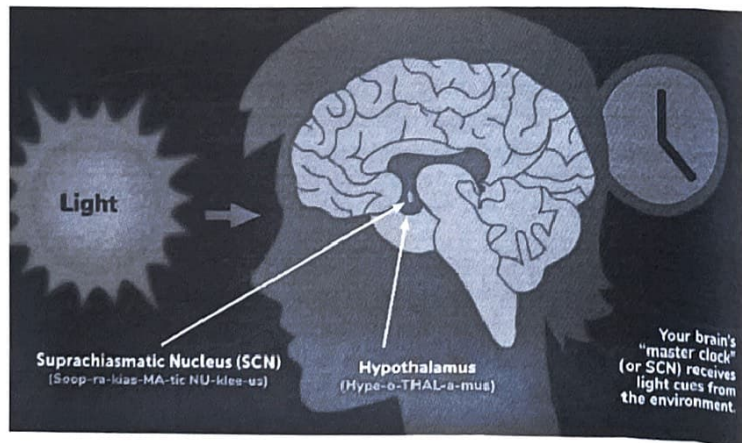
Melatonin and the Suprachiasmatic Nucleus (SCN)

**Melatonin** is a sleep-inducing hormone. It is associated with alertness, where **high levels** of melatonin cause **reduced alertness** (more tired or drowsy) and **low levels** of melatonin **increases alertness**.

**The suprachiasmatic nucleus** is located in the hypothalamus and regulates most of the body's circadian rhythms, including the sleep-wake cycle. It acts as a pacemaker to ensure the correct timing of each circadian rhythm.

Levels of melatonin are controlled by the suprachiasmatic nucleus. It

adjusts our sleep-wake cycle by responding to the amount of light seen in the external environment. When there are high levels of light, such as in the morning, the suprachiasmatic nucleus directs the **pineal gland** to secrete less melatonin. This can cause an individual to become more alert and less tired. However, when there are low levels of light, such as at night, the SCN triggers the pineal gland to release more melatonin, thus increasing drowsiness and fatigue. This helps to induce sleep.



# IMPORTANCE OF SLEEP TO MENTAL WELLBEING

## Sleep disturbances

Generally speaking, we follow a regular sleep cycle throughout our life. Although this may change gradually as we get older, it tends to remain relatively similar. However, sometimes this cycle can be disrupted and we see changes in the sleep-wake cycle. The body regulates the sleep-wake cycle with the aid of **melatonin**. Melatonin is released in response to 'dark periods' (night) and suppressed in response to 'light periods' (day).

### Sleep deprivation

There are **two types** of sleep deprivation: **partial** and **total**. Partial deprivation is where the person sleeps less than normal, while total deprivation is where the person has no sleep at all. In this study design, we look only at partial sleep deprivation which can occur through either an inadequate quantity of sleep, or an inadequate quality of sleep which does not contain enough REM/NREM sleep.

Partial sleep deprivation can have a serious impact on a person's emotions/mood, behaviours, and cognitive abilities. You must be able to clearly explain the effects of such sleep deprivation.

Mood (affective)	Behaviour	Cognitive abilities
<ul style="list-style-type: none"> <li>• Amplified emotional responses tend to occur.</li> <li>• Lack of motivation, irritability, anger or frustration.</li> </ul>	<ul style="list-style-type: none"> <li>• Less <b>energy</b> and less motivation to engage in activities.</li> <li>• Simple, boring tasks most affected.</li> <li>• More likely to <b>express amplified</b> emotions.</li> </ul>	<ul style="list-style-type: none"> <li>• Ability to <b>focus</b> and problem-solve is compromised.</li> <li>• Difficulty thinking clearly, reasoning, making decisions and recalling <b>memories</b>.</li> </ul>

### Sleep Deprivation vs Alcohol Consumption

Sleep deprivation has been shown to have detrimental effects on cognition, concentration, and mood. It causes an altered state of consciousness comparable to alcohol consumption.

	Total sleep deprivation (24 hours)	Blood alcohol concentration (BAC) of 0.05
<b>Cognition</b>	<ul style="list-style-type: none"> <li>as number of waking hours increase, performance on cognitive tasks decreases</li> <li>reaction time slows</li> <li>decision making and problem solving is impaired</li> </ul>	<ul style="list-style-type: none"> <li>as BAC increases, performance on cognitive tasks decreases</li> <li>reaction time slows</li> <li>decision making and problem solving is impaired</li> </ul>
<b>Concentration</b>	<ul style="list-style-type: none"> <li>trouble focusing</li> <li>ability to complete simple, repetitive tasks are more impaired than complex tasks</li> </ul>	<ul style="list-style-type: none"> <li>difficulty using focused or divided attention</li> </ul>
<b>Mood</b>	<ul style="list-style-type: none"> <li>increase in negative mood</li> <li>emotional reactivity increases</li> <li>increased feelings of anxiety and depression</li> </ul>	<ul style="list-style-type: none"> <li>amplified OR dulled emotional responses</li> <li>more fluctuation in mood</li> </ul>

**Research on the subject has shown:**

- Being awake for 17-19 hours is equivalent to a 0.05 BAC and makes you twice as likely to have an accident.
- Being awake for 24 hours is equivalent to a 0.10 BAC and makes you seven times more likely to have an accident.



## Changes in Sleep-Wake Cycle

### Delayed Sleep Phase Syndrome (DSPS)

**Delayed Sleep Phase Syndrome (DSPS)** is a circadian rhythm sleep disorder that causes an individual to have a sleep pattern delayed by two or more hours beyond the conventional bedtime. Those with DSPS tend to have difficulty falling asleep and waking up early, even when going to bed at an earlier time. There is also difficulty in waking up at a desired time, meaning that they usually **fall asleep and wake up later**.

This is because of the difficulty of resetting the sleep-wake cycle in response to environmental stimuli. There is a **mismatch** between the sleep-wake cycle desired and the sleep-wake cycle obtained.

This can occur for many reasons. One reason is because of the pattern of **light exposure** the individual experiences. When not experiencing enough light in the morning, it means that melatonin secretion will increase, therefore causing drowsiness. Further, when experiencing too much light at night, such as the light from your phone, melatonin secretion decreases, causing an increase in alertness and difficulty sleeping. Other reasons may include jetlag and changes during puberty in adolescence.



Often people with DSPS describe themselves as 'night owls' as they feel they function best at night. However, DSPS can cause drowsiness during the day, difficulty concentrating or performing cognitive tasks and potentially amplified emotional responses.

### Advanced Sleep Phase Disorder (ASPD)

**Advanced Sleep Phase Disorder (ASPD)** is the opposite of DSPS. It is a circadian rhythm phase disorder where people fall asleep too early (generally between 6pm-9pm) and wake up too early (generally between 3am-5am). It is often characterised by a difficulty to stay up at night and sleep at a conventional time. In ASPD, there is a mismatch between the sleep-wake cycle desired and the sleep-wake cycle obtained, as one's sleep schedule is **earlier** than the average person.

ASPD can develop due to environmental factors including light exposure. When there is too much light exposure in the early morning, melatonin secretion will reduce, causing individuals to be more alert. This may shift their sleep-wake cycle earlier than the conventional cycle.

Unlike DSPS which is common in adolescence, ASPD is more common in older age. It often causes drowsiness in the late afternoon, which may impact reaction times, behavioural functioning and cognitive abilities like decision making.

However, in both DSPS and ASPD, **bright-light therapy** can be used as a treatment to help reset the circadian rhythm into developing the desired sleep-wake cycle.

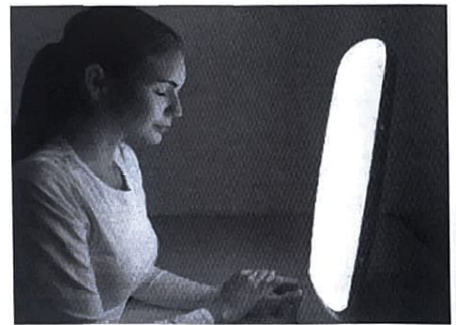
## Shift Work

People whose jobs require them to do shift work will often work long hours at strange times throughout the day or night. This will often cause major **disturbances to their natural body clock** and sleeping patterns. These changes mean shift workers can sleep at very unnatural times of the day and have **sleep deprivation**.



## Bright Light Therapy as a Treatment

Bright Light Therapy is often used to **treat circadian phase disorders**, where patients' body clocks aren't functioning as they should. Your body clock is set by a number of factors, including hormones, temperature, time of day, and light exposure. Light therapy exposes the patient to bright light for a set period of time at a set time during the day in an attempt to reset their body clock and suppress melatonin, allowing them to restart a normal sleep cycle.



## Improving Sleep-Wake Patterns

There are a number of ways to improve sleep-wake patterns. It is important to maintain a healthy sleep-wake cycle as it can help to regulate emotions, increase cognitive abilities and maintain behavioural functioning. Consequently, improving our sleep-wake pattern can improve our mental wellbeing.

## Sleep Hygiene

**Sleep hygiene** refers to the healthy, positive habits an individual keeps to promote uninterrupted sleep that aids in waking up feeling well-rested. It includes environmental factors and behaviours that make it easier to fall asleep and stay asleep throughout the night. It is important to maintain good sleep hygiene as it has been seen to not only help physical health, but also improve mental wellbeing. Some factors that can help achieve good sleep hygiene are listed below:

- Going to bed at the same time each night and waking up at the same time each morning
- Exposure to sunlight during the day
- Consuming healthy food and drink
- Avoiding electronics before sleep
- Exercise during the day
- Having a relaxing routine pre-sleep
- Avoiding caffeine and alcohol before sleep
- Removing naps in the day

## Zeitgebers

The body runs on an internal clock that regulates the timing of circadian rhythms, including sleep. **Zeitgebers** are external environmental cues that can impact the body's circadian rhythms. They influence the **synchronisation** of our biological rhythms to the external environment. This means that it is important to have zeitgebers that can maintain the natural circadian rhythm timing of our body's, and not ones that may result in poor sleep-quality. Essentially, by controlling zeitgebers you are exposed to, you can maintain **consistent circadian rhythms**.

Some key zeitgebers include exercise, eating habits and importantly, light exposure. Generally, most people should be exposed to light in the morning when needing to be awake and be less exposed to light at night when needing sleep. This gives the **SCN** appropriate signals to regulate melatonin, resulting in feelings of tiredness when needing to sleep and alertness in the mornings.

## Daylight & Blue Light

As previously learnt, **light exposure** can influence the amount of the sleep-inducing hormone, melatonin that is released. This means by controlling when someone is exposed to different light intensities, we can influence the timing of sleep (circadian rhythm).

People should be exposed to **daylight** during the day, usually in the mornings. Sunlight exposure in the day helps promote wakefulness as it aids in resetting the sleep-wake cycle. It does this as light causes the SCN to trigger the pineal gland to secrete less melatonin. As a result, people will become more alert in the day, shifting the sleep-wake cycle to an appropriate time where an individual becomes tired at night, resulting in better quality sleep.

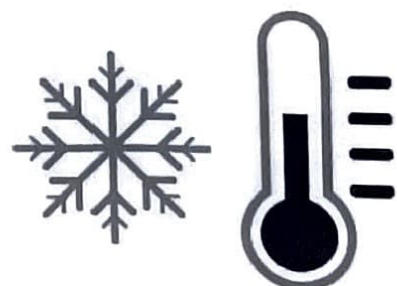
In the evening and at night, researchers suggest minimising the amount of light people are exposed to. They suggest doing this by dimming light in the house a couple hours before sleep and by sleeping in a dark room to promote melatonin secretion.

Research also suggests minimising the use of electronics such as phones and laptops before going to bed as it produces **blue light**. Blue light will also cause melatonin levels to decrease, meaning that people will likely feel more awake at night and less likely to want to sleep. This may result in poor-quality sleep or a difficulty in falling asleep.

## Temperature

**Temperature** can influence sleep-quality and wakefulness. Exposure to heat can increase wakefulness and result in restless sleep, whereas **colder room temperatures** make falling asleep easier and help promote good-quality sleep. Research has shown that the ideal external temperature to encourage sleep is approximately 18° C.

Body temperature is usually maintained at approximately 37° C. Around 1-2 hours before sleep, body temperature

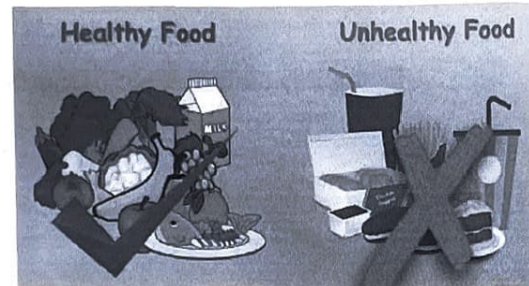


begins to reduce which is also when melatonin begins to be released. This is preparing the body to fall asleep.

### Eating and Drinking Patterns

**Eating and drinking patterns** have been seen to influence the timing of our sleep-wake cycle (circadian rhythm) and also the quality of sleep received.

Consuming a **balanced, nutritious diet** that is high in fibre, protein, vitamins and minerals can promote good sleep-quality. These foods include whole grains, vegetables, fish and so on. People should also avoid foods high in sugar to improve sleep quality.



The **timing** of when people eat also impacts sleep quality. It is suggested that people should not consume food close to when they sleep. This is because the body will still be digesting food when needing to sleep, therefore possibly disrupting sleep-quality or the ability to fall asleep quickly. The last piece of food consumed should be a few hours before going to bed as the digestive system will have time to completely digest the food, thus resulting in a comfortable, good-quality sleep.

Drinking habits, such as consuming caffeine, also impact our sleep-wake cycle. **Caffeine** is a **stimulant**, therefore can keep people awake and make it more difficult to sleep. When drinking caffeine, it is suggested to be consumed well before going to sleep, such as in the mornings, so that it has less impact on the quality of sleep received.

## UNIT 4 | AOS 2 – WHAT INFLUENCES MENTAL WELLBEING?

### Key Concepts

#### Defining mental wellbeing:

- Define mental health as a continuum, influenced by internal and external factors
- Distinguish between stress, phobia and anxiety
- Describe the characteristics that can contribute to mental wellbeing including levels of functioning, resilience and social and emotional wellbeing (SEWB)
- Explain how social and emotional wellbeing is seen as a holistic framework for Aboriginal and Torres Strait Islander Peoples

#### Application of a biopsychosocial approach to explain specific phobia:

- Describe the biological, psychological and social factors that contribute to the development of specific phobia

- Explain the biological, psychological and social evidence-based interventions that can be used to treat specific phobia

#### Maintenance of mental wellbeing:

- Describe the biological, psychological and social protective factors for maintaining mental wellbeing
- Explain how cultural determinants promotes wellbeing in Aboriginal and Torres Strait Islander Peoples
- Explain and provide examples of predisposing, precipitating, perpetuating and protective factors relating to the development of mental health disorders
- Explain the biological, psychological and social risk factors that contribute to the development of a mental health disorder

## DEFINING MENTAL WELLBEING

### What is mental health?

**Mental health** is the capacity of an individual to interact with others and the environment in ways that promote subjective wellbeing, and involves the effective use of one's cognitive, emotional and social abilities.

It is important to recognise that mental health lies on a **continuum** from mentally healthy, to having a mental health problem, to having a mental disorder. The placement of an individual on this continuum can be influenced by a plethora of **social, psychological, and biological factors** from both their internal and external environment.

Mentally Healthy	Mental Health Problem	Mental Illness/disorder
<p>People who are mentally healthy can:</p> <ul style="list-style-type: none"> <li>● Form positive relationships with others</li> <li>● Cope with the normal stressors of everyday life</li> <li>● Think clearly and logically</li> <li>● Experience pleasure and enjoyment</li> <li>● Use their abilities to reach their potential</li> </ul>	<p>The mind of people with a mental health problem doesn't function as well as it could. People may:</p> <ul style="list-style-type: none"> <li>● Feel tense, low, irritable, quiet, confused, angry</li> <li>● Experience increased or decreased sleep and appetite</li> <li>● Experience a loss of energy and motivation</li> <li>● Feel that things are somehow different</li> <li>● Have difficulties concentrating</li> </ul>	<p>People who are diagnosed with a mental illness:</p> <ul style="list-style-type: none"> <li>● No longer function in a way that allows them to reach their potential</li> <li>● Can't deal with the stress of everyday life</li> <li>● Require psychiatric intervention</li> <li>● Examples: anxiety disorders, depression, schizophrenia, bipolar disorder</li> </ul>

**Mental health is not fixed and can fluctuate over time** due to internal and external factors. This is shown through the example scenario below.

Example

Grace had a very happy childhood and was always mentally healthy: she had lots of friends and did well at school. In Year 12, Grace put a lot of pressure on herself and became very stressed because of school; she began to feel a bit unhappy which was out of character, so she went to a therapist and received some tips about how to stay mentally healthy. She used these and completed Year 12 successfully. Throughout university, Grace remained mentally healthy, sometimes struggling a bit around exam time. However, when she was 27, Grace’s mum passed away and Grace began to feel depressed. A year after her Mum passed away, she still couldn’t get up for work, and never wanted to go out with friends. Eventually, she underwent grief therapy and recovered well. She is now mentally healthy again.

Stress, Anxiety & Phobia

This continuum can be used to distinguish between **stress**, **phobia** and **anxiety** and illustrates the mental wellbeing variations for individuals.

**Stress** is a state of physiological and psychological arousal produced by internal or external stressors that are perceived by the individual as challenging or exceeding their ability or resources to cope.

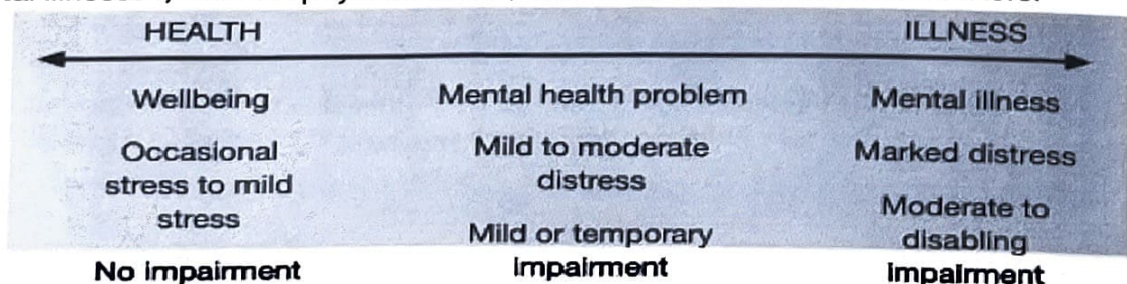
**Anxiety** is a state of physiological arousal associated with feelings of apprehension, worry, or uneasiness that something is wrong or something unpleasant is about to happen.

**A phobia** is characterised by **excessive or irrational fear** of a specific stimulus. Whilst some fears are rational, phobias are completely unreasonable and out of proportion to the situation. Whilst stress and anxiety are not mental disorders in themselves (although they may contribute to a mental disorder), a phobia is in itself a diagnosable mental disorder.

## Distinguishing mental health from mental illness

Mental health and mental illness are both complex states, which are difficult to define and to determine in an individual. They **are not simple opposites**, and each is not the absence of the other. People often have characteristics of both states at the same time.

An integral part of the definition of mental health is that the person is not just free from illness but is **actively and positively engaged with life**. This recognises the person’s capacity to fulfil their goals and ambitions, to **cope with usual life stressors**, and to interact productively with others. Of course, many things may interfere with this, not just mental illnesses, but also physical illness, and social and environmental factors.



For example, a physical injury that stops you from playing in your team's grand final is likely to make you feel unhappy and impair your mental health without you having a mental illness. Similarly, the death of someone close may make you experience grief, which is entirely normal and not a mental *illness*, but affects your mental *health*.

Therefore, mental illness is not simply the absence of mental health. **The abnormal thoughts or behaviours present in someone with a mental illness go beyond an expected reaction to a stimulus**, such as having a panic attack when confronted with a tight deadline for a project.

**Health** is a state of complete physical, mental and social well-being, not merely the absence of disease. **Mental illness** describes a psychological dysfunction that usually involves impairment in the ability to cope with everyday life, as well as thoughts, feelings, and behaviour that is atypical of the person, being serious enough to require psychiatric intervention.

## Ways of considering mental wellbeing

### Levels of Functioning

Those who are considered mentally healthy may be associated with having high levels of functioning. This includes being productive, contributing to the community, having meaningful social interactions and so on. By having high levels of functioning, mental wellbeing may be promoted as people may feel they have a purpose in life and can add a source of joy in life.

### Resilience

Resilience is a person's **ability to cope with stressors and to bounce back when negative things happen to them**. People who ruminate and focus on negative emotions are less likely to be resilient and are, therefore, more likely to develop a mental health problem. Those with higher resilience have traits such as high self-efficacy, emotional awareness and control, positive outlook, and good communication skills. Generally, they will be able to manage change in life and any uncertainty about the future.

Psychologists believe that people who are resilient have the ability to:

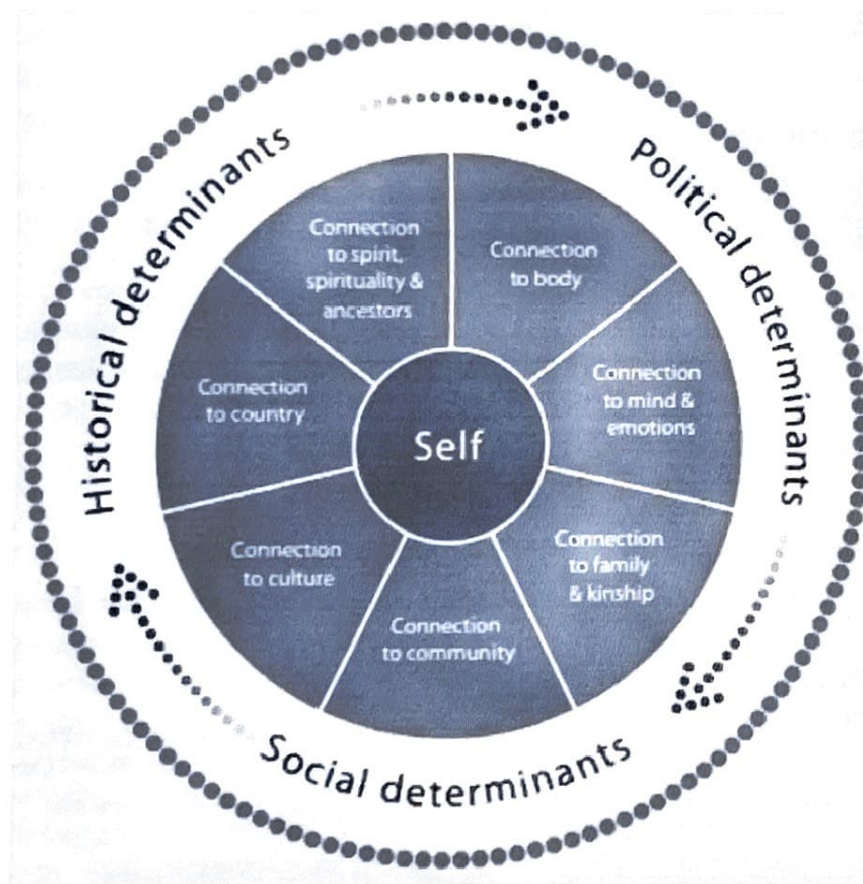
- Achieve positive results, despite adverse situations
- Function well in situations of acute or ongoing stress
- Recover from trauma

### Social and Emotional Wellbeing (SEWB)

**Social wellbeing** refers to the ability to form and maintain satisfying relationships with others. This can be seen through having a supportive network of friends, socially interacting appropriately with others, having effective communication skills and so on. Often, those with high social wellbeing may also be able to adequately solve conflicts with other people.

**Emotional Wellbeing** refers to the ability to manage and express emotions appropriately and comfortably. It is being able to recognise and understand the emotions you're feeling, and then express them in healthy ways in appropriate contexts. Those with high emotional wellbeing can often manage stress well and accept change that occurs in life.

**SEWB for the Indigenous Peoples of Australia** encapsulates all domains of being including body, mind and emotions, family and kinship, community, culture, country, spirituality and ancestors. These domains recognise the **historical, political and societal** influence on SEWB for Aboriginal and Torres Strait Islander People's. The framework is seen **holistically** where SEWB is impacted by the continuous interactions and connections between these elements. It is based on the collective function of the domains that can each help to promote Aboriginal and Torres Strait Islander Peoples SEWB.



### The domains

**Connection to body** □ functioning body systems; feeling healthy; being able to participate in daily activities; being physically healthy

**Mind & Emotion** □ the ability to manage and express thoughts and feelings; having a strong identity; feeling safe and secure; self-esteem; relates to mental health and wellbeing



**Family & Kinship** □ caring relationships; having a support system; stable and safe family; feeling accepted by family; helps to connect with cultural identity

**Community** □ Indigenous Peoples and families connecting with one another; support network of those around you; a place to find identity; having community services that is in line with Indigenous People's needs; helps connect to culture

**Culture** □ maintaining and continuing the relationship to Aboriginal and Torres Strait Islander history; elders passing on knowledge of culture and heritage to future generations; aids in building self-identity; building cultural values and connection; having opportunities for cultural involvement in the community

**Country** □ connection to the land and its spiritual meaning; having a sense of belonging to the land, relates to culture and ancestral history; helps build self-identity when spending time on Country

**Spirituality & Ancestors** □ the traditional and cultural beliefs of Aboriginal and Torres Strait Islander Peoples; built upon the knowledge and experiences passed down from ancestors; deeply connected to Country, the soul and spirit; provides people with a sense of purpose and belonging in life; helps to promote SEWB by having feelings of connection and meaning from spirituality and ancestors.

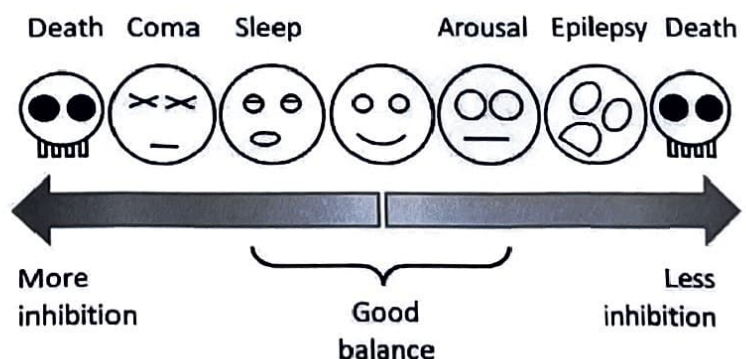
## APPLICATION OF A BIOPSYCHOSOCIAL APPROACH TO EXPLAIN SPECIFIC PHOBIA

### Biological risk factors

Biological risk factors may predispose individuals to be more susceptible to mental disorders. These factors include (but are not limited to): genetics, prenatal damage, infections, brain defects, brain trauma and substance abuse.

#### GABA Dysfunction

- **GABA** is the main **neurotransmitter** involved in the experience of **anxiety**.
- Its main role is to **inhibit the firing of neurons** to fine tune neurotransmission.
- **Without this occurring**, there is no 'calming agent' to help regulate the effect of the excitatory neurotransmitters that contribute to anxiety.
- Low GABA levels can be due to a number of factors, including genetics, CNS damage, stress, nutritional



deficiencies, and caffeine intake.

**Anxiety occurs when there is not enough inhibition due to insufficient amounts of GABA, causing increased arousal.**

### Long Term Potentiation

This is the biological component of learning a fear response. When the neural pathway representing the fear response for a particular stimulus is constantly activated, the pathway will strengthen, thereby strengthening the association between the phobic stimulus and the fear response which makes the individual less likely to forget the fear response.

## Biological interventions

### Benzodiazepine Agents

The use of short-acting anti-anxiety **benzodiazepine agents** targets the CNS to act directly on **GABA receptors**, increasing their inhibitory effect to try and lower anxiety levels. Since they increase the neurotransmitter's activity, benzodiazepines are known as **GABA agonists**. These agents lower the activity of the nervous system and induce symptoms, such as sleepiness and relaxation.

It is important to realise that drugs such as benzodiazepines **only treat the physical symptoms** of anxiety; they do not provide a solution to address the cause of the phobia.

### Breathing Retraining

Common symptoms of a phobia are **hyperventilation**, where a person begins to breathe faster and deeper than normal due to heightened anxiety, and **tachypnoea**, when a person's breathing becomes shallow and rapid. Such breathing patterns cause dizziness, blurred vision, and/or pins and needles that can cause even more distress for the individual.

To avoid this, **breathing retraining** can be used for people with phobias. This involves teaching them new breathing techniques, such as breathing through pursed lips, helping the person take control over their breathing to lessen the physiological symptoms of uncontrolled breathing.

## Psychological risk factors

Psychological risk factors may predispose individuals to be more susceptible to mental disorders. These factors include (but are not limited to): psychological trauma, emotional abuse, physical abuse, loss of a loved one and neglect.

## Behavioural Models

Phobias can be precipitated (caused quickly) by classical conditioning and perpetuated (kept going) by operant conditioning.

### Precipitation – Classical Conditioning

- Neutral stimulus (e.g. snake) is paired with an unconditioned stimulus (e.g. unpleasant event – your mum being bitten by a snake, screaming, crying, and having to go to hospital).
- The neutral stimulus (snake) then becomes a conditioned stimulus after the NS and UCS become associated with each other.
- Now, whenever you see a snake, you associate it with fear, screaming, and crying.
- This conditioning can occur after just **one** association.

### Perpetuation – Operant Conditioning

- Once the fear response has been learnt, it can be maintained through operant conditioning.
- Avoiding the fearful stimulus (snake) is negatively reinforced by removing any unpleasant stimulus, which encourages the person to stay away from the phobic stimulus.
- This, however, keeps the phobia alive as the person is doing nothing to try and face their fear.
- Fear responses can also be positively reinforced by operant conditioning if the person is comforted and reassured when they have a phobic response.

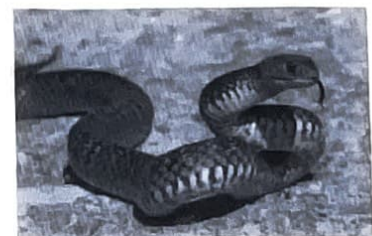
## Cognitive Bias

Cognitive bias occurs when a person processes information in a way that involves **faulty judgement and poor decision making**. It is essentially when a person believes or thinks something that has been altered by personal beliefs or experiences that may not necessarily be true. There are **two types** of cognitive bias; memory bias and catastrophic thinking.

### Memory Bias

This type of bias suggests that current knowledge or beliefs about a particular stimulus (i.e. the phobic stimulus) has been distorted by prior experience and past feelings. It can also be referred to as selective memory.

- **Change bias** □ occurs when past information is exaggerated beyond what it was in reality to match the person's current fear.
  - E.g. remembering the snake as being more aggressive, bigger, and faster than it really was.



- **Consistency Bias** □ occurs when past information is distorted to fit in with the person's current beliefs.
  - E.g. a person will only remember the one time the snake bit their mum, and will ignore all the other times they had seen snakes before then and they hadn't harmed anyone.

Catastrophic Thinking

Involves thinking patterns in which scenarios or objects are exaggerated beyond what they actually are to imagine the worst possible outcome.

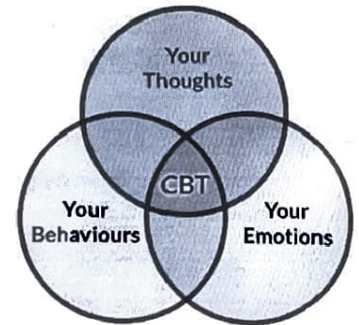
E.g. a person with a phobia of snakes will think that if they visit a reptile house, the snake will escape, get angry, and bite them and the person will die, when, in reality, the snake is kept safely locked up in a box or under the watch of a handler.

Such thinking will make a person feel out of control, which in turn makes them feel even more anxious as they feel unable to cope, creating a vicious cycle of anxiety.

**Psychological interventions**

Cognitive Behavioural Therapy

CBT is used to help people with phobias identify the **root cause** of the phobia, allowing them to change their thoughts and behaviours to improve their coping skills. A therapist will help the person identify their distorted beliefs, then teach them to reflect and reconsider their cognitive biases through sourcing facts and information about their phobia.



E.g. if a person has a phobia that every plane they get on is going to crash, CBT can help them overcome this by allowing them to learn about planes and see why their pattern of thinking is flawed.

Systematic Desensitisation

This process uses the components of classical conditioning to try and teach the person to 'disassociate' or 'unlearn' the unwanted fear response through exposure to the stimulus in a relaxed, safe environment.

- First, the person is taught **relaxation techniques**, such as breathing techniques and mental imagery.
- The person then has to create a '**fear hierarchy**' - a list of situations, going from ones that would provoke the least anxiety, to ones that will produce the most.
- The patient then undergoes **graduated exposure** to the fear hierarchy, whilst using the

Behavior	Fear rating
Think about a spider.	10
Look at a photo of a spider.	25
Look at a real spider in a closed box.	50
Hold the box with the spider.	60
Let a spider crawl on your desk.	70
Let a spider crawl on your shoe.	80
Let a spider crawl on your pants leg.	90
Let a spider crawl on your sleeve.	95
Let a spider crawl on your bare arm.	100

relaxation techniques. This, hopefully, breaks down the association between the conditioned fear stimulus and the fear response.

## Social risk factors

Social risk factors may predispose individuals to be more susceptible to mental disorders. These factors include (but are not limited to): lower socioeconomic status, job insecurity, social exclusion and housing instability.



### Specific Environmental Triggers

A single traumatic or distressing event often causes phobias. Exposure to such events can put a person at increased risk for developing a specific phobia. For example, a person is in a plane when it hits turbulence, an engine fails, and it has to emergency-land. This then triggers the person to develop a phobia of planes from that day on.

Not all traumatic events will trigger a specific phobia, and if there is direct exposure to the stimulus soon after the incident occurs, this will often help prevent a future phobia. For example, getting back on a horse right after you fall will help prevent developing a phobia of horses.



### Stigma

As mentioned before, the stigma surrounding getting help for mental disorders, including phobias, often **prevents people from seeking help**, which can prolong the phobia and cause it to get worse over time. The person may fear others thinking they are overreacting or being childish. This is especially true if the person has a phobia of something particularly harmless, such a balloon or clouds. In such cases, most people around the sufferer may perceive their behaviour to be completely irrational and may, therefore, have a hard time understanding and empathizing with the sufferer.

## Social interventions

### Psychoeducation

Used to educate the families and supporters of those with a specific phobia (or any mental disorder), helping them empathise with and understand what the person is going through.

Psychoeducation can include teaching family and friends about any of the following:

- The nature of the disorder
- Details of the phobic stimuli
- What it feels like for the person to have a phobia



- The impact the mental disorder has on family and friends
- Treatments that are available
- What their role in the treatment for the person is

This type of support and understanding from family and friends can play a huge role in the recovery of a patient, as they will **feel less stigmatized and ostracised**.

**Psychoeducation** also helps phobia sufferers, since family and friends are able to aid them in their recovery when they may not be rational enough to do so. They do this through challenging unrealistic or anxious thoughts to avoid catastrophising and use encouragement to support the sufferer to stop avoiding the phobic stimulus.

## MAINTENANCE OF MENTAL WELLBEING

### Biopsychosocial approach

There are many things we can do as individuals and as a society to improve our mental health. The biopsychosocial approach considers biological, psychological and social factors and their interactions with one another, to best understand health and illness.

### Biological protective factors

#### Adequate Nutritional Intake & Hydration

A healthy variety of vitamins and minerals is important in maintaining both physical and mental health, improving mood, energy and sleep for effective functioning. In order to do this, you must:

- Eat from a variety of food groups
- Drink lots of water
- Eat at regular time intervals throughout the day
- Avoid using meal replacements or supplements
- Avoid drugs and alcohol



#### Adequate Sleep

Sleep is extremely important for mental health, in particular REM sleep, which helps with the repair of neural connections in the brain. Inadequate sleep can negatively impact mental health (as we learnt earlier) because lack of sleep can cause our emotions to become heightened and our cognitive processing to become distorted.



## Psychological protective factors

### Cognitive Behavioural Strategies

These are techniques taught in cognitive behavioural therapy that allow people to recognise if their thoughts are becoming distorted so that they can **correct their problematic way of thinking**. This is part of what is covered in CBT, not CBT itself. These strategies teach people to avoid falling back into their negative thought patterns through asking questions such as:

- What evidence do I have about the situation?
- Is there an alternative explanation?
- What would I tell a friend in the same situation?
- What is the likelihood that what I'm thinking of is actually going to happen?
- Is there a more helpful way to think about this?

### Mindfulness Meditation

**Mindfulness meditation** is a mental training technique that aims to calm the mind and body through slowing down thoughts and focusing on the present. It involves **accepting** thoughts and feelings and letting go of judgment so that you don't feel overwhelmed.

There are many ways to practice mindfulness meditation. The most common technique is to find a quiet space with minimal distractions and get comfortable. It then involves **breathing deeply** and focusing your **attention** to the breath so that other thoughts don't come to mind. If thoughts do come to mind, mindfulness meditation encourages observing these thoughts with no judgement and re-directing attention to your breathing.

By using mindfulness meditation, mental wellbeing can be promoted as it allows people to focus on the present and live in the now, rather than focus on thoughts about the past or anxious thoughts about the future. This will help to **reduce feelings of stress** and can reduce effects of the sympathetic nervous system, such as by slowing heart rate down, therefore, allows the individual to maintain mental wellbeing and function more efficiently on a daily basis.

## Social protective factors

### Support from Family and Friends

Social support is extremely important in maintaining mental health over the lifespan. There are many different types of support that family and friends can give a person who may be struggling, including:

- **Appraisal support** – support that helps a person understand their thoughts and feelings, and aids them in coping.

- **Tangible assistance** – giving material goods that may help the person, so they need not stress about money or meals.
- **Emotional support** – reassuring a person that they are supported, valued, and cared for.
- **Informational support** – providing practical information about how to deal with a stressful event.



## Cultural determinants

**Cultural Determinants** relate to the connection Aboriginal and Torres Strait Islander Peoples have to Country, cultural identity and community. In relation to health, cultural determinants are protective factors that can promote and maintain one's overall **wellbeing**. There are many cultural determinants, including **self-determination** and **cultural continuity**.

### Self-determination

**Self-determination** refers to the ongoing process of Indigenous Peoples right to choose and to have control of decisions that can impact their life. It relates to Australia recognising that Aboriginal and Torres Strait Islander Peoples are Australia's First Peoples and allowing them the freedom to live their life according to their own thoughts, values and beliefs. Self-determination is critical for Indigenous Peoples wellbeing as it can alleviate stress and help to receive the appropriate healthcare treatments when required. Giving Indigenous Peoples the power to make decisions regarding their own lives means they can have full control over decisions regarding their healthcare, family, education, finances and so on.

### Cultural-continuity

**Cultural continuity** refers to preserving the historical importance of culture along with cultural identity, values and traditions through generations. By culture being sustained through generations, it can allow people to feel more connected with their own identity, therefore can increase self-esteem. Cultural continuity may help Aboriginal and Torres Strait Islander Peoples feel a sense of pride around their culture, potentially increasing confidence levels and sense of security within themselves. It has been seen that cultural continuity has boosted resilience levels which promotes wellbeing as people will be better able to cope with adversity and change in life.



# UNIT 4 | AOS 3 – RESEARCH METHODS

## Key Concepts

### Variables:

- Write experimental aims and hypotheses
- Identify independent and dependent variables
- Operationalise variables

### Scientific research methodologies:

- Evaluate the strengths and limitations of different experimental designs
- Distinguish between qualitative and quantitative data collection techniques
- Define reliability and validity of data
- Generalise statistics from samples to the wider populations
- Explain extraneous and confounding variables
- Outline the ethics and issues of research, including use of human subjects

### Key skills:

- Analysing and evaluating data to identify sources of error and limitations
- Key findings of investigation and their relationship to psychological concepts and theories
- Conventions of psychological report writing

Many students don't like studying this topic as it's quite dry; however, once you start putting a decent amount of effort into it, you'll start to appreciate its importance. After you've done 15 or so research methods cases, you should be able to handle any questions thrown at you, since they tend to be quite repetitive on exams.

### List of typical VCAA questions

The following is a list of questions that could be asked as part of a research report. Ensure you know how to answer all of the questions in relation to a case study (note that most of the following questions are sourced from the Unit 4 short-answer research methods section of past VCAA exams):

- Identify the **aim**.
- Provide an **operationalised dependent and independent variable (DV/IV)**.
- Form a **hypothesis**.
- Identify the **experimental design**.
- Identify the **population**.
- Identify the **sample**.
- Identify a **controlled variable**.
- Identify a **confounding variable**.
- Identify an **extraneous variable**.

- Provide a **criticism** of the research.
- Suggest an **improvement** to the research.
- Explain the **results** (mean, median and mode).
- Form a **conclusion**.
- Determine whether the **results can be generalised**.
- Determine which **ethical principles** have been breached or adhered to.
- Explain the purpose of a **control** group.
- Identify why the study is an **experiment**.
- Explain the difference between **random sampling and random allocation**.
- Explain **random stratified sampling**.
- What is the **placebo** effect?
- What is the **order** effect?
- What is the **experimenter** effect?
- What is standardisation in terms of instructions and procedure?
- What's the difference between a **single-** and **double-blind** procedure?
- What is the purpose of **repeating an experiment**?
- What can you **infer from descriptive statistics**?

## Aim

The aim of an experiment refers to what it is trying to explore, discover, or **investigate**. They usually begin with "The aim of this experiment was to investigate ...." Then you merely sub in whatever the experiment is focusing on.

### Example

It could be looking at "the effect of a certain new drug on sport performance", or testing "the effectiveness of playing quiet music while studying". If you subbed in any of the two quotes from the last sentence into "The aim of this experiment was to investigate ....." or simply "To investigate ...." they'd fit perfectly and be awarded full marks for being an appropriate aim.

## Experimental variables

IVs and DVs are something that everyone seems to get confused about, but once you know the difference everything becomes crystal clear and picking out the IV or DV becomes second nature to you.

### Independent variable

The independent variable refers to a factor (or variable) that is being manipulated, changed or varied by the experimenter. The IV is what the experimenter believes will have an effect on the results. **An easy way to spot the IV is to look at the difference in conditions between the experimental and control groups.** Is it taking a certain drug that's the difference? Or is it being exposed to a certain stimulus such as a book or

television program? Or is it simply being deprived of something like sleep or a particular food?

In most exams it will ask you to clearly state the IV. Here's a template you can use when forming your IV:

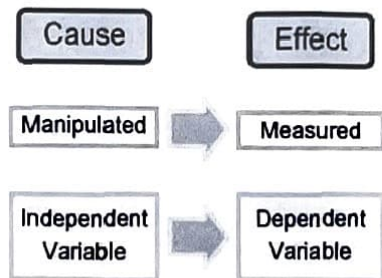
**"Whether the participants are given/exposed to ..... or ....."**

Alternatively,

**"Whether the participants are ..... or ....."**

### Dependent variable

The dependent variable is what's being measured in the experiment. It's called a dependent variable because it *depends* on the effects of the independent variable. Therefore, we can say that the IV causes a change in the DV. The DV will always be closely related to the results of the experiment.



For example: a person's ability to recall information could be tested by giving them a list of words to memorise after they've been exposed to the IV. The number of words correctly recalled would give a good indication of how much sleep deprivation affected participants, which would be the IV. "The number of words correctly recalled" is, therefore, the DV.

### ~~Operationalising variables~~

~~Usually, you will be asked to operationalise your variables. This means to include the exact and specific details about how you will be manipulating the IV, and how you will be measuring the DV.~~

~~To operationalise the IV, you must state how the conditions differ in terms of the IV under study and you must do this by being as **specific** as possible. Rather than being vague and using 'sleep deprivation', an operationalised IV will be much more specific on how the groups actually differ. An operationalised IV for the aforementioned experiment would be:~~

~~"Whether the participants are being deprived of sleep for 8 hours for three consecutive nights or being allowed to sleep naturally".~~

~~OR~~

~~"Whether or not participants are deprived of sleep for 8 hours for three consecutive nights".~~

To **operationalise your DV**, you must remember two key things:

- **Be as specific as possible**; include any numbers or details that are relevant. E.g. if the DV is “the number of words correctly recalled”, to make it more specific you’d mention how many words they had to memorise to begin with so you’d instead say “the number of words correctly recalled from a list of 15 words”.
- **Bring in a quantity**. This **MUST** be measurable. Whether it be “number of” or the “amount of time”, it must be something that is measurable.

### Example

“The number of words correctly recalled by the participants from a list of 15 words”. If it weren’t operationalised, you’d just say “recall ability” - see how it’s much more general and there’s no quantity?

## Forming a hypothesis

The hypothesis is an educated prediction of what will occur in the experiment. It must be *testable and measurable*. The researcher always needs to predict what happens so that they can compare the end findings and results to what they originally expected would happen.

You may start your hypothesis with “**It was predicted that .....**” or simply “**That .....**”. You should just pick one way of starting and stick with it for the rest of the year because you’ll need to write plenty of hypotheses.

**Your research/experimental hypothesis must include:**

- Independent Variable
- Dependent Variable
- A prediction on the most likely/plausible outcome where a direction of the variable is stated (e.g. higher/more/lower/less)

### Example

So, let’s use sleep deprivation and its effects on recall as our example once more. The population is Year 12 students from Apple High School. Your research/experimental hypothesis would look something like this:

“**It was predicted that year 12 students from Apple High School would have greater recall ability when they were allowed to sleep as opposed to those who were sleep deprived.**”

Can you see each element? Try to label the above research/experimental hypothesis and see if you identified each element correctly by looking at the answer on the next page.

- *IV* is italicised
- DV is underlined
- **Prediction of the most likely outcome** is bolded

“It was predicted that year 12 students from Apple High School would have **greater recall ability** when they *were allowed to sleep* as opposed to those who were *sleep deprived*.”

Use the above example to structure the rest of your hypotheses. Make sure you also compare each condition, just like I have at the end. I mentioned those who slept and those who were sleep deprived; it would be incorrect to only mention one of those groups.

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**Exam Tip:** Make sure you mention the **population**, not the sample. Plenty of students make that mistake; the best way to check is to look to see if you’ve accidentally included any quantity of the participants; if there is, then that’s probably the sample, not the population.

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**Exam Tip:** in your exam, if it asks for a ‘research’ or ‘experimental’ hypothesis then you must not write an operationalised one. If, however, it simply states “write a hypothesis” you can choose to write either a research/experimental hypothesis or an operationalised hypothesis. There’s a much greater chance you’ll be asked for a research/experimental hypothesis, since this has replaced “operational hypothesis” in the new study design.

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## Participants

### Population

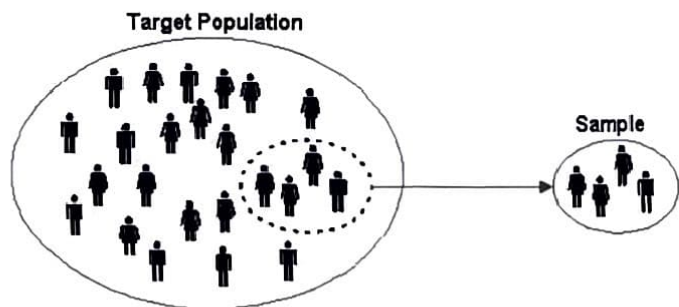
The population is the **very broad group of people to whom you’re trying to generalise your results**.

If a study has been conducted correctly, then the conclusions drawn from the research should be able to be applied to the particular population the researcher has targeted.

The researcher will always have to pick a specific target population, whether it be kindergarteners from the local day care centre, or high school students at the local private school.

### Sample

The sample refers to the **participants who are actually taking part in your study**. It is a subgroup of the population. Testing the entire target population is usually impractical and cannot be carried out, so the researcher takes a handful of participants from the population and uses them in their experiment. If the sample has been selected correctly, then the findings from the research could be generalised back to the population.



### Example

Picture a big block of cheese in a deli; this represents your population. You can ask the assistant to give you a little cube of the cheese to taste. You'd assume the cube you've been given is going to be very similar, if not identical, in taste and odour to the rest of the big block. This little cube is your sample. You've taken a small portion from the bigger group (population), tested it, and then generalised the taste and smell of it to the entire cheese block, based on your experience with that one small cube (the sample).

Your sample will also have a quantity in most cases. For instance, it could be "30 high school students from the local school", whereas the population would just be the broad group of "all high school students from the local school".

To sum up: **Population = Broad**, while **Sample = a smaller portion**.

## Methods of participant selection and allocation

**Participant selection** involves choosing the people who are going to be involved in the study/experiment. This will involve "sampling" from the population. On the other hand, **participant allocation** occurs once people have already been selected for the study/experiment and involves dividing participants into the different experimental groups that are going to be used. Either way, both present issues with controlling extraneous variables and possibly confounding the results of the study.

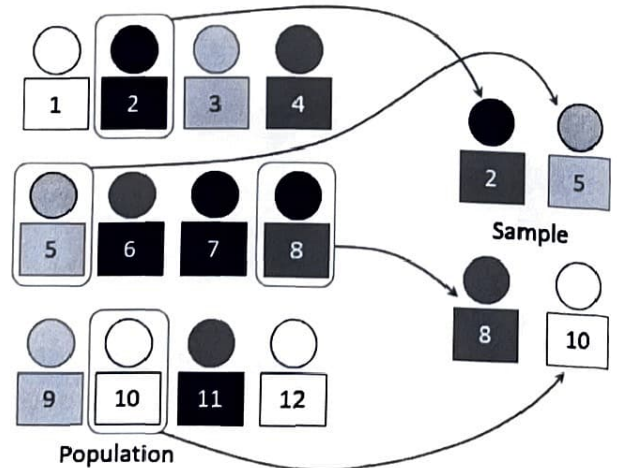
To sum up: **Selection = for experiment**, while **Allocation = within experiment**.

### Random sampling

**Random sampling** is a sampling procedure that ensures every member of the population of research interest has an **equal chance** of being selected as a participant of a study. If the sample size is large enough, it will usually provide a representative sample of the population.

E.g., tossing a coin and heads = in experiment, placing the names of every member in the population in a box and pulling out 50 names, allocating each member of the population a number and generating a "table of random numbers" that decides the sample.

A **biased sample** is when everyone in a target population does not have an equal chance of being selected as a participant. This means that results cannot be generalised to the wider population.



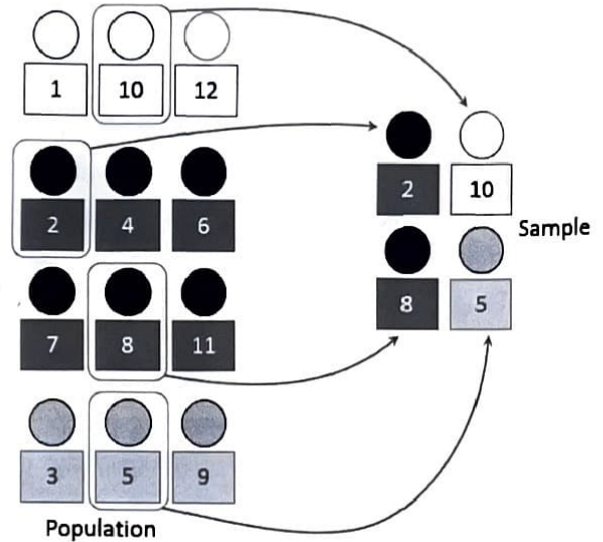
### Stratified sampling

**Stratified-random sampling** involves dividing all of the people in the population into distinct subgroups (strata), then selecting samples in the **same proportions as they occur in the target population**. Strata can be based on different characteristics, traits or social factors.

E.g., age, sex, IQ score, location (state/city/suburb), schools, religion.

~~Random-stratified sampling involves using random sampling techniques for each strata, where every member of that strata has an equal chance of being selected for the experiment.~~

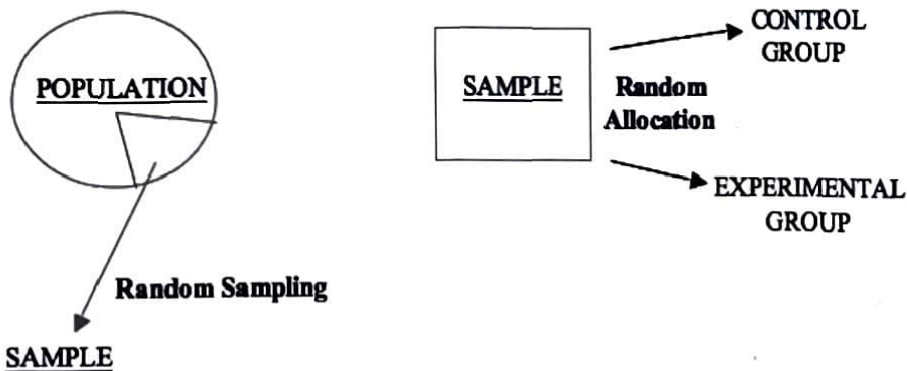
~~E.g., splitting the population into males and females, then placing all male names in one box and placing all female names in another box. Then, picking out names from each box according to their proportion in the population to be in the sample.~~



### Random allocation

Random allocation is a procedure for assigning participants to the various groups **within an experiment** that ensures that each person has an equal chance of being selected for any group.

E.g., tossing a coin for each member of the sample, placing the names of every member of the sample into a box and pulling out names to be in the control group.



Strengths and limitations of participant selection and allocation methods

Method	Strengths	Limitations
<b>Random sampling: every member of the population has an equal chance.</b>	Highly representative sample! Can allow for generalisations (if sample large)	Need a complete and updated list of entire population. Potentially time-consuming.
<b>Stratified sampling: different strata sampled.</b>	Highly representative sample! Great for comparison purposes between strata.	Need a complete and updated list of the entire population. More time-consuming.
<b>Random-stratified sampling: strata sampled randomly.</b>	Greater precision when comparing findings to population > highly representative!	Need a complete and updated list of the entire population. More time-consuming.

**Investigation Methodologies**

You must be aware of the features of each design, as well as the advantages and disadvantages of each. This will help you identify any possible extraneous variables that may produce an unwanted result on the DV that was not caused by the IV. The only way to become good at determining the design used is to practice!

**Controlled Experiment:**

Between-subjects design - **independent groups**

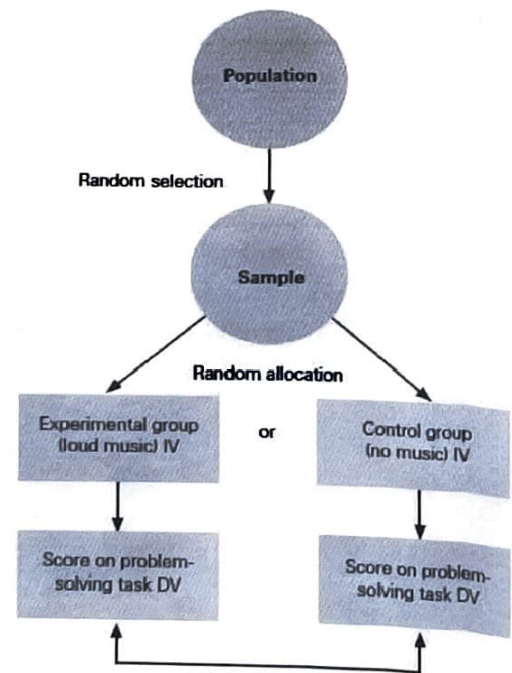
Where each participant is randomly allocated to **one group**. The simplest experiment involves two conditions: a control group with no IV and an experimental group with the IV present. The purpose of the control is to establish a **baseline for comparison** with the experimental group. Without a control group, the effect of the IV on the experimental group cannot be properly assessed.

**Strengths:**

- **No order effects.**
- More **time efficient** because all the **experimental groups can occur simultaneously.**

**Limitations:**

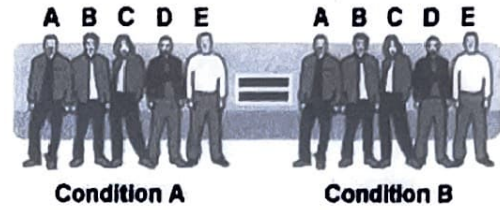
- **Less control over participant variables.**
- **More participants required** than repeated measures to ensure accurate representation of the population of interest.





Within-subjects design - repeated-measures

Where each participant is exposed to both the experimental and control conditions.



Strengths:

- Almost completely eliminates potential confounding variables, like participant differences because they are kept constant between conditions by using the same participants.
- Fewer participants are required making it cost-effective.

Limitations:

- It's more time consuming because participants have to partake in both conditions. This can lead to participant withdrawal ("attrition").
- It can produce order effects if not appropriately counterbalanced.

A related procedure for reduce the negative effects of a repeated measures design is **counterbalancing**. This involves changing the order of treatments or tasks for participants in a balanced way to ensure order effects are offset.

E.g. half of the participants will receive treatment 1, then treatment 2, while the other half will receive treatment 2, followed by treatment 1.

Mixed design

Where a study has at least one feature of a between-subjects design and one feature of a within-subjects design. These studies not only assess the potential difference between two or more different groups of participants, but also assess the change of each group over a period of time.

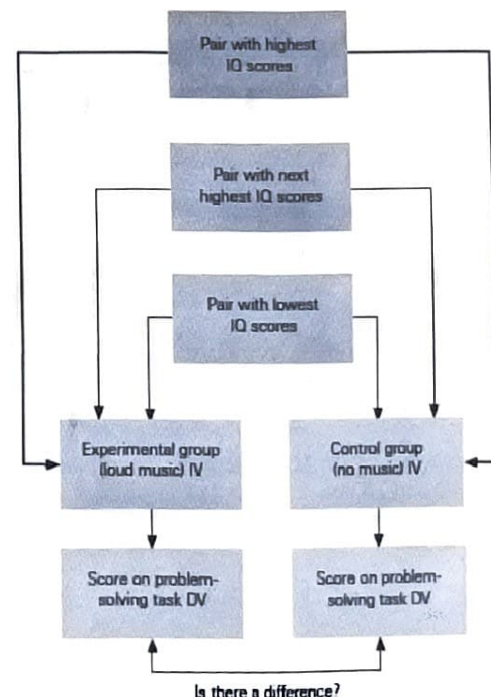
Matched-participants design

A **matched participants design** selects pairs of participants who are very similar in terms of a characteristic which could affect the DV (usually based on one particular characteristic such as age or IQ). Each member of the pair is randomly allocated to a different group in the experiment.

E.g., in an experiment that tests memory throughout the lifespan, participants could be matched based on age and then split up – one person goes to the control group, whilst the other person in the pair goes to the experimental group.

Strengths:

- Eliminates potential confounding variables based on whichever characteristic has been matched.
- No order effects because participants only experience the condition that they have been allocated to.



### Limitations:

- If one participant from a pair drops out then the other member of the pair is also removed from the research.
- **Time-consuming:** requires a significant amount of time and pre-testing to match people on a certain characteristic before study begins.

### Case study

An in-depth investigation of some behaviour or event of interest in an individual, group or situation. Case studies can be used to form hypotheses for future research and can provide valuable information on a specific case. However, they do have their own limitations. Analysing case studies is a time-consuming process. It's also difficult to generalise the results discovered because they were based on only one person, group or event, and they're more open to bias since usually one individual creates the case study.

### Fieldwork

Involves collecting data by carefully watching and recording behaviour as it occurs without experimental intervention.

Advantages of fieldwork include the elimination of potential confounding variables, such as artificiality and demand characteristics. They allow for long-term effects on behaviour to be studied and also for the study of certain behaviours that only occur in a natural environment (i.e. they can't be artificially reproduced).

Limitations include difficulties in determining the cause of observed behaviour, since many factors in a natural environment can have an impact. There's observer bias because the observer can choose what to include in their report, and also sometimes informed consent procedures aren't followed properly.

### Self-report

Involves participants responding to questions about their thoughts, feelings or behaviour either orally or in writing. Methods include interviews, surveys, questionnaires or rating scales. A limitation is that it is subjective data, meaning the researcher can't verify it.

### Questionnaire

A written set of questions designed to structure self-report information from people on a topic of research interest. An advantage is that information about a large number of people can be collected in a short time frame. They also provide the opportunity for people to answer honestly, since there's guaranteed anonymity in their responses. However, a limitation is that people still give misleading information to create favourable impressions of themselves.

## Correlational research

Involves measuring two different variables and assessing the relationship between the two variables, without the manipulation of an independent variable. These experiments are known as non-experimental as there is no active intervention by an experimenter.

## Types of data collection

**Quantitative data** is measurable data, expressed in scores or numbers.

**Qualitative data** is descriptive data, expressed in words or images. It is important to apply:

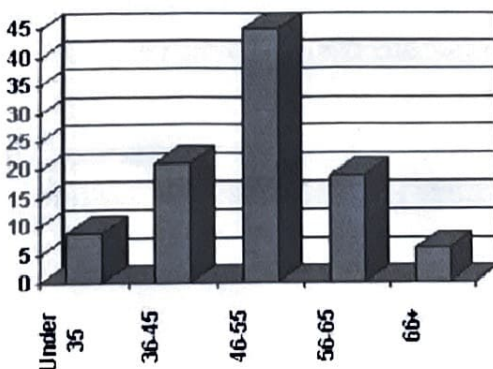
- **Accuracy:** The degree to which a measurement represents the true value.
- **Precision:** The degree of resemblance among different results, under the same circumstances.
- **Repeatability:** How close measurements are to each other when repeated.
- **Reproducibility and validity:** The degree to which the study measures what is intended to be measured - and how easy it is to reproduce similar results.
- **Errors:** Differences between a value obtained in data and the 'true' value.
- **Uncertainty in data:** The quantitative estimation of error present in the data collected.

## Recording and explaining results

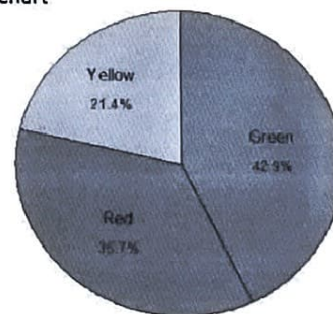
The amount of statistics in VCE psychology is quite minimal; however, when explaining results there are **three measures of central tendency** (descriptive statistics that summarise data by identifying a score that suggests the location of the middle of the range of scores) you must know about: mean, median and mode.

- **Mean:** shows the average score for each group
- **Median:** shows the middle number/mid-point for each group
- **Mode:** shows the most common score in each group

These are called **descriptive statistics** and used to help communicate what was found from the data collected. Other examples include graphs, charts and tables, that all present and communicate the data.



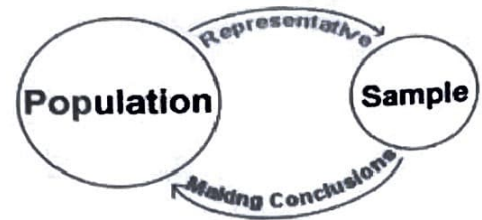
Pie Chart



It is important to note that you cannot make any conclusions based on these statistics. They are only there to summarise and collate the data.

### Standard deviation

**Standard deviation** is a measure which shows to what extent the values in a data set deviate from the mean. The greater the standard deviation, the greater the spread of scores are in relation to the mean value.



- **1 standard deviation of the mean:** 68% of data values.
- **2 standard deviations of the mean:** 95% of data values.
- **3 standard deviations of the mean:** 99.7% of data values.

## Extraneous and confounding variables

Any variable that the researcher has made constant is a controlled variable. This is done to ensure it doesn't impact on results. To identify a controlled variable, just look for something that remains the same, either for the participants (such as age or gender) or for the conditions of the experiment (such as temperature of the room, the place where the experiment was carried out or the number of exposures).

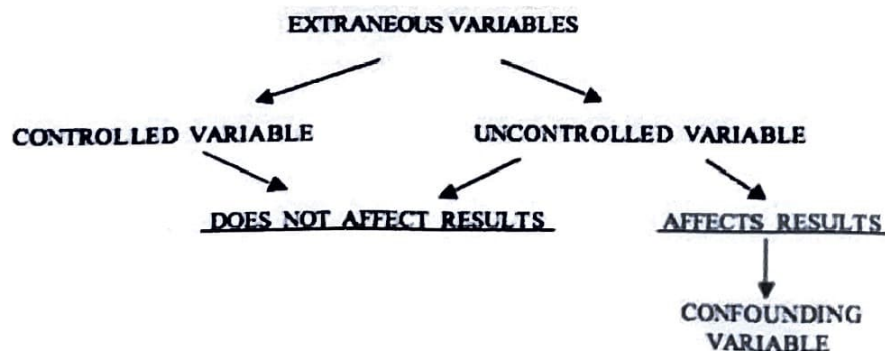
When variables are not controlled, they can impact on the results in an unwanted way. This may affect your ability to conclude that the experiment was a valid and reliable study.

### Extraneous and confounding variables

An **extraneous variable** is any other variable apart from the independent variable that has the potential to affect the results (or DV) in an unwanted way. They're associated with the characteristics of the participants, the experimenter, or the design of the experiment itself.

A **confounding variable** is any other variable apart from the independent variable that has had an unwanted effect on the results. It "confuses" the results because the researcher is not certain whether the results were due to the IV or due to the confounding variable. If a confounding variable is discovered, then the research is considered **void** and will have to be repeated without any confounding variable for it to be valid.

The key difference between extraneous and confounding is that with **extraneous** it **MAY** affect the results, while with **confounding** it **actually HAS** affected the results.



## Potential confounding variables

- Individual participants differences
- Non-standardised instructions and procedures
- Order Effects
- Experimenter Effects
- Placebo Effects

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**Exam tip:** The above confounding variables are commonly identified, so they may be the most likely types of confounding variables to be on your exam.

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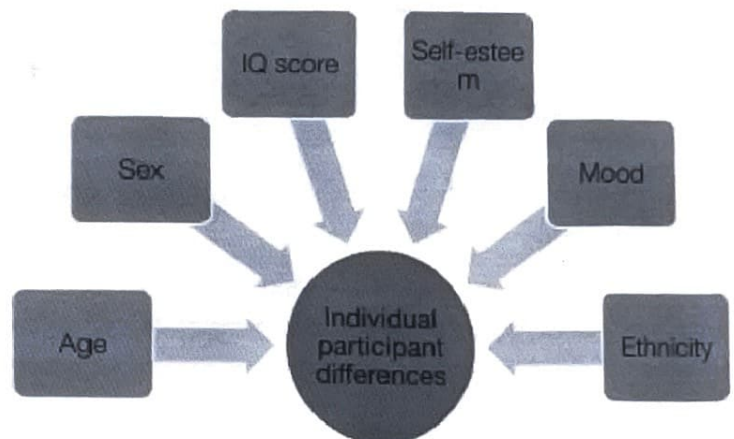
### 1) Individual participant differences

Any characteristic or trait of participants that may affect how they **respond** in an experiment. This may include age, sex, IQ score, memory ability, personality, mood, etc.

E.g., A participant in a positive mood is more likely to be enthusiastic about the study and respond to the best of their abilities. On the other hand, a participant in a negative mood may be less motivated to respond or participate fully and honestly.

#### How to control:

- **Large groups** that have been randomly sampled. Having a large number of participants may result in an **even spread of characteristics** in each group/condition.
- **Random-stratified sampling** of each distinct characteristic/trait that could impact on the results.
- **Within-subjects design:** repeated-measures design to keep participant variables constant in each condition.
- **Matched-participants design** to pair participants based on important characteristics/traits that could impact the results in each condition.



## 2) Non-standardised instructions and procedures

**Standardisation** involves ensuring all instructions and procedures in an experiment are constant for each participant. The experimenter must deliver instructions using the **same wording and manner** to minimise extraneous variables that might influence participant groups to respond differently.

E.g., the experimenter might read the instructions in a specific tone to one group and not the other, which may affect their behaviour/results.

Furthermore, environmental conditions should be carefully controlled. These factors include: day of week, time of day, temperature, noise level and physical setting.

### How to control:

- **Standardised instructions and procedures:** uniform, pre-determined scripts that are not ambiguous and anticipate possible questions from participants.
- **Double-blind procedure** to ensure that experimenter cannot give special/different instructions and procedures to a certain group over another.

## 3) Order effects

An **order effect** occurs when **performance (DV) is influenced by the specific sequence in which the participants receive each experimental condition (IV)**. This is only relevant to a **within-subjects design**, where participants are exposed to both experimental conditions. It includes factors such as fatigue, practice effects, or even boredom.

**Practice effects** include any change in results due to previous practice or exposure to the experimental condition.

E.g., participants are asked to recall a list of words. In one condition, participants are allowed to recall the list immediately after learning. In the next condition, participants are only allowed to recall the same list after a minute gap between learning and recall. Participants may perform better in the second condition because they have already learnt the list in the first condition.

**Carry-over effects** include any change in results due to the effects of the IV still being present in participants.

E.g., an experimenter wants to investigate the effects of alcohol on driving ability. In the first condition, participants reach a blood alcohol level of 0.10 and then take a simulated driving test. In the second condition, participants drink no alcohol and take the simulated driving test. Participants may perform worse in the second condition because the effects of alcohol in the first condition may not have worn off completely if not enough time has been allowed.

**How to control:**

- **Counterbalancing** removes order effects by presenting participants with the IV in all possible sequences – e.g., Condition 1 = no IV > IV, Condition 2 = IV, no IV.
- Using a **different experimental design** that doesn't require the same participants for both conditions (between-subjects design).

## 4) Experimenter effects

An **experimenter effect** occurs when there is a **change in a participant's response due to the researcher's expectations, biases or actions, rather than the effect of the IV**. This links with experimenter bias, where the researcher's unconscious expectations or motivation may influence and distort their observations of data.

A **self-fulfilling prophecy** is when the experimenter seeks to obtain the answers wanted. They may do this through methods of *experimenter expectancy*; cues about how participants should respond.

E.g., A professor has developed a theory and wants to prove it right. He provides cues to the experimental group about how they should respond, including smiles and thumbs up when they answer accordingly. The professor has also recorded the results himself and has made sure to omit any responses that do not align with his theory.

**How to control:**

- **Standardised instructions and procedures** to remove any possibility of biases, special gestures or cues.
- **Double-blind procedure** so that the experimenter does not know which group is receiving the experimental condition, and therefore, cannot provide any biases/cues.

## 5) Placebo effect

The **placebo effect** occurs when there is a **change in the responses of participants due to their belief that they are receiving some kind of experimental treatment**, and they respond in accordance with that belief instead of the actual effect of the IV.



Whenever a new drug is tested, the actual drug is usually given to half of the participants (experimental group), while the other half receive a placebo such as a sugar pill, which has no effects (control group). This ensures the placebo effect is partially offset because the participants are not aware of what they are receiving.

**How to control:**

- **Single-blind procedure** so that participants are unaware of what condition they are allocated to. This removes any expectations or beliefs about what treatment they are receiving.

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Students often get confused between the placebo and the placebo effect. This question from the 2013 VCAA exam shows this:

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*Use the following information to answer Questions 11–16.*

Experimental research was conducted to trial medication for the management of schizophrenia. This medication was in a tablet that was given to participants.

Participants drew an odd or even number from a hat. Participants who drew odd numbers formed the control group; participants who drew even numbers formed the experimental group. A double-blind procedure with a placebo was used.

**Question 11**

In this research, the placebo could be defined as

- A. the effect of the medication.
- B. the tablet containing no medication.
- C. a participant's expectation of the effect of the medication.
- D. the tablet containing the medication that was being trialled.

25% of students selected C) as the placebo in this scenario, however this describes the placebo effect instead. Remember: the placebo is the **inactive treatment/substance**. The placebo effect is how this treatment/substance may influence participant's response due to its expectations. Therefore, the correct response is B) "the tablet containing no medication".

**E.g.**, participants who believe they are consuming caffeine may record higher energy levels due to the expectation that caffeine reduced tiredness.

## Methods to control potential confounding variables

There are many ways to limit the effects of potential confounding variables, such as using a different experimental design or sampling technique. However, there are specific methods that have been created to combat potential confounding variables.

### Single blind and double blind procedures

The **single-blind procedure** is when participants are unaware of which condition they have been assigned to (in 90% of single blind studies, it is the participants who are unaware; however, in some cases it's the experimenter only who is unaware). This is beneficial in minimising placebo effects as participants are unable to respond according to their expectations of the treatment they are receiving – they don't know!



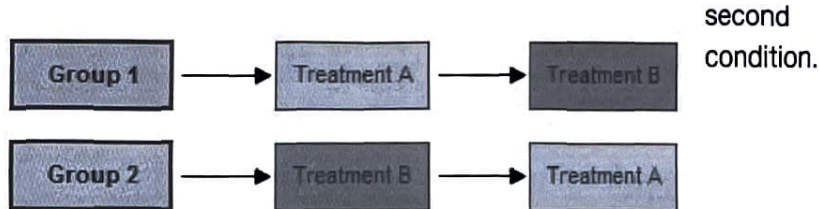


The **double-blind procedure** is when neither the experimenters, nor participants are aware of which participants have been allocated to which group. This is beneficial in minimising experimenter effects as the experimenter is unable to give special cues to one group over another.

### Counterbalancing

Counterbalancing involves **changing the order** in which participants are exposed to the experimental and control conditions. This minimises any unwanted effect on performance of any one order. Counterbalancing is particularly helpful in a within-subjects design, where all participants are exposed to all conditions in the experiment.

E.g., in an experiment about the effects of alcohol on driving ability, half the sample may be tested driving with a blood alcohol level of 0.10 in the first condition, and then having no alcohol in the second condition. The other half of participants may be tested with no alcohol in the first condition, and then a blood alcohol level of 0.10 in the



Summary table		
Variable	Unwanted effect on DV	How to control
<b>Individual participant differences</b>	Different traits/characteristics of participants may affect how they respond/make them more or less reactive in the study. E.g., age, sex, IQ, mood, motivation.	Large sample group to even out differences across all conditions. Random-stratified sampling. Within-subjects design that keep participant variables constant.
<b>Non-standardised instructions and procedures</b>	Can provide cues to participants about how/what to respond.	Pre-determined, uniform standardised instructions and procedures. Possibly a double-blind procedure.

<b>Order effects</b>	Order in which IV is presented to participants can affect their results – practice, carry over effects, fatigue or boredom.	Counterbalancing. Not a within-subjects design – opt for between-subjects design where participants are not subjected to all conditions of the experiment.
<b>Experimenter effects</b>	Provide cues to participants about how/what they should respond based on experimenter biases/expectations.	Double-blind procedure to remove any knowledge about each condition. Standardised instructions and procedures.
<b>Placebo effect</b>	Participants respond in accordance to beliefs about special treatment they are receiving, rather than to the effect of the IV alone.	Single-blind procedure to remove knowledge/expectations about what treatments participants are receiving.

## Forming a conclusion

The conclusion is a judgement about **what the results of the experiment mean**. This is where we revisit our aim and hypothesis, and determine what the experiment has shown.

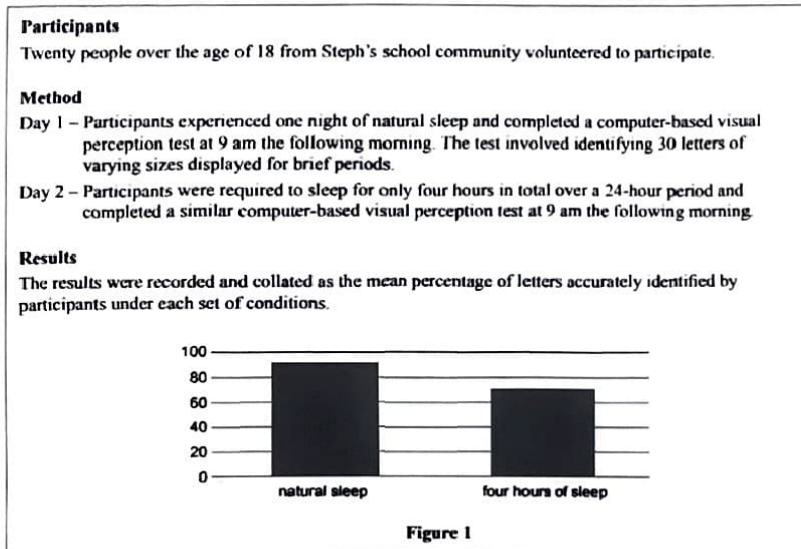
The characteristics of a good conclusion:

- Was the hypothesis supported or rejected based on the results?
- Were there any limitations to the study? Describe their effects on the results and how they could have been controlled.
- Suggest any improvements for the study.
- Have all ethical principles and guidelines been adhered to?
- Can a generalisation be made to the wider population? Why/why not?

Many students struggle with answering questions that need evaluations of scientific results take this question from the 2019 VCAA exam:

**Question 5 (8 marks)**

Year 12 student Steph was concerned about the possible adverse impacts that staying up late to study might have on the ability of drivers who are on their learner permit or probationary driver licence to accurately perceive visual stimuli while driving. To investigate this, Steph conducted research as described below.



c. Suggest a conclusion for Steph's research.

3 marks

The examination report indicated that only 9% of students achieved full marks and 34% of students achieved 0 marks.

The question is worth three marks and thus contains three components:

- referring to the relationship between the IV and the DV
- stating the results in terms of mean accuracy of letter identification being lower than in the partially sleep deprived condition
- framing the conclusion with reference to the actual research that Steph conducted including reference to her research aims and how those aims were operationalised

Conclusions from data presented in research scenarios in VCE Psychology can only be drawn with direct reference to the sample studied and whether or not observed patterns within the sample are consistent with the hypothesis.

Sample responses could include:

“While it is not possible to apply the findings of the present study to learner and P-plate drivers specifically...the results are consistent with the hypothesis that the visual perception of adults is impaired after sleep deprivation”

“Steph cannot draw any direct conclusions about the impact of staying up late to study on the visual perception of L- and P-plate drivers...because her sample did not specifically contain L-and/or P-plate drivers....and the test of visual perception was not conducted under driving conditions”

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**EXAM TIP** If the hypothesis was supported by the results, you should NOT say that it was 'proven correct' or 'found to be true'. Nothing can be proved from a single experiment. You must instead say, "the hypothesis was supported or accepted, based on the results".

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### Limitations of the study

These should be based on the choice of participants, the procedure, or the results obtained. It is important to choose relevant criticisms - ones that are definitely possible factors, which could negatively affect the researcher's findings.

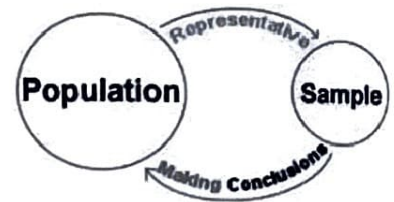
This is where you can discuss confounding variables as well, but make sure they're 100% relevant to the actual experiment and not a confounding variable which could be applied to any sort of experiment. **The more specific it is, the better.** When identifying any possible confounding variables, make sure to explain how they confounded on the results, and how they can be minimised in future..

Determining appropriate criticisms and confounding variables is probably the most poorly done section for most students, so please pay special attention to it!

### Generalisations

This is where we determine if the results of the study on the sample can be related to the wider population. In order to do this, the sample must be representative of the population.

**Example:** If your population was first year post-secondary students, and your sample was only TAFE students, then the sample would not be consistent with the population, since university students in the population have not been tested.



## Ethical principles and guidelines

Before any psychological research is undertaken, the experimenter must make sure that moral principles and standards have been applied to maintain an appropriate level of participant care. The research needs to be carefully designed so that the data can be collected without harming the participants in any way, physically or psychologically. Once the experimenter is satisfied that the study does not breach any ethical guidelines, he/she must submit the proposal of the research to an ethics committee, which scrutinises it before giving the experimenter permission to proceed.

## Ethical concepts

- **Beneficence:** The commitment to maximising benefits and minimising the risks and harms involved in taking a particular position or course of action.
- **Integrity:** The commitment to searching for knowledge and understanding, and the honest reporting of all sources of information and results, whether favourable or unfavourable, in ways that permit scrutiny and contribute to public knowledge and understanding.
- **Justice:** The moral obligation to ensure that there is fair consideration of competing claims; that there is no unfair burden on a particular group from an action; and that there is fair distribution and access to the benefits of an action.
- **Non-maleficence:** Involves avoiding the causations of harm; however, as a position or course of action may involve some degree of harm, the concept of non-maleficence implies that the harm resulting from any position or course of action should not be disproportionate to the benefits from any position or course of action.
- **Respect:** Involves consideration of the extent to which living things have an intrinsic value and/or instrumental value; giving due regard to the welfare, liberty and autonomy, beliefs, perceptions, customs and cultural heritage of both the individual and the collective; consideration of the capacity of living things to make their own decisions; and when living things have diminished capacity to make their own decisions, ensuring that they are empowered where possible and protected as necessary.

## Ethical guidelines

**Confidentiality** – this refers to the principle that all personal information and responses of the participants in an experiment must not be revealed without their permission. Participants also have the right to participate anonymously.

**Voluntary Participation** – in any psychological study, participants must be given the freedom to decline participation. Participants must not be coerced, given bribes, or threatened in any way. If they are given a payment, it should only be to cover any costs incurred in being involved in the study, rather than serving as a money-making exercise. There should also be no negative consequences as a result of declining involvement in a study.

**Withdrawal Rights** – participants should be told that they are free to leave at any stage of the study so their welfare is not compromised in any way. They also have the ability to ask that their results be omitted from the study at any time following completion of the study.

**Informed consent procedures** – Before any investigation begins, potential participants need to decide whether to participate in an experiment after being told of the nature and purpose of the research. As already stated, their participation must be totally voluntary and, whenever possible, their



consent should be obtained in writing. **If the participant is under 18 years of age, informed consent must be provided by a parent or guardian.** Informed consent consists of two parts: being informed and consenting. The informing part requires the process and intent of the research to be explained, as well as the rights of the participants and any risks involved.

The consent part requires the participants (or their parents if they're under 18) to agree to take part in the study.

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**Exam tip:** You must comment on both the informed AND consent aspects of informed consent if it asks you to discuss this ethical principle. Most students only discuss one aspect and don't get full marks.

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**Debriefing** – this is where the researcher, **after the experiment**, explains the true nature of the research to the participants. The participants are then given the opportunity to ask any questions about the research and to comment freely on any part of the experiment. This procedure ensures that the participants experience no lasting harm whilst ensuring that the purpose of the investigation is not compromised.

Debriefing should incorporate:

- Full explanation of the findings in the study
- Information about where and how to seek counselling if needed
- The right to withdraw data after the experiment

**Use of deception** – often it is necessary to hide the true nature of an experiment from the participants before the data is collected. This approach attempts to prevent subject expectancy effects and obtain genuine, unbiased data. If subjects are led to believe that the researcher is investigating one particular question, but is really investigating another, **then the subjects must be debriefed after the data is collected.**

## SMARTER STUDY

This section is about doing more with less. It's about focus. We'll suggest strategies you can use to more efficiently study, and more effectively approach the exam, which is not only about how much you know, but how well you can show what you know in the face of uncertainty.

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**NOTE** These are suggestions. Your mileage may vary.

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### Top tips

#### #1: Trust your gut instincts.

In Psychology especially, your gut instinct seems to lead you in the right direction. This is most relevant to your multiple-choice section. Only change a multiple-choice answer if you're 110% sure it must be changed.

#### #2: Be quietly confident, but don't be complacent.

The main trap most of the students doing Psychology fall into is the belief that the subject is "easy". The content of the subject isn't overly complex like that of something like specialist mathematics. However, just because the content may be simple, you should not believe it's an easy subject.

I found that by making sure I didn't think the subject was easy and that I was "blitzing it", I ensured that I worked even harder to compensate for the difficulty I knew I was faced with in achieving a high score.

#### #3: If you're struggling with explaining a certain concept, learn the definition by rote.

There will be some areas that you find hard to put into words; I myself experienced this several times.

E.g. stratified sampling was one concept I understood but putting it into words was something I found difficult. To overcome this, I learnt the definition/explanation of stratified sampling off by heart and so, the next time I faced a question on it, I didn't waste time worrying how I could word my explanation properly.

I normally don't recommend rote learning, but there will be times when it becomes necessary and very useful.

#### #4: Assessor's reports should become your bible.

Examiner's reports contain so much vital information about what examiners expected in a response, the average mark that students received for the question and even examples of high-scoring responses. This will help when you are trying to practice and form your own responses in VCAA exams.

**#5: Highlighters are your best friend in Psychology.**

Highlighters are extremely useful when it comes to the exam. You can highlight the command term, mark allocation and any key word in the question that gives you a clue as to what to include in your response.

**#6: Practice, practice, practice (exams)! Especially VCAA ones.**

The best way to get used to the exam format and pressure is to do VCAA practice exams from previous years.

VCAA exams are the most valuable exams to do as, 1) they will be written in a similar fashion to your own end-of-year exam, and 2) you're able to become familiar with popular concepts and questions that are asked often! If you treat your VCAA practice exam like your own VCAA end-of-year exam, then hopefully this will act as a cue for the retrieval of your memories related to the course.

Also, don't hesitate to start practice exams early: people have the idea of "save the best till last". If you leave VCAA exams until a couple of days before your exam, you won't leave yourself with enough time to spot patterns in the exams, properly go over the assessor's reports and plenty of other crucial things!

**#7: Do past papers from a different study design.**

You should definitely be doing past study design exams! Use the study design to determine whether you actually need to learn any unfamiliar topics you come across in an old study design exam (e.g. application of operant conditioning is no longer taught in learning, but you'll still come across questions in old exams dealing with the three-phase process of operant conditioning).

The VCAA also released a document outlining the changes between the two study designs, so please have a look at this as well.

**#8: Don't fall into the trap of only practicing multiple-choice.**

The area that contains the majority of the marks for the exam is the written response, short-answer section (B).

Many things can go wrong in written responses, while in multiple choice, most of the state scores very highly. Practicing short-answer responses will help you form explanations of concepts that are clear, concise and well-organised.



**#9: When doing practice exams, you should slowly phase in stricter conditions.**

It's important to make sure your practice exams are completed under proper exam conditions. This means timing needs to be exact, including reading time. Even try doing them around the same time of your exam.

All of these conditions **need to be phased in**; if you follow all the rules above on your first practice exam, it'll be too intimidating for you! Make sure you slowly make them stricter. I personally recommend doing your first 2 with your book and without timing it, then adding in the quiet factor and not looking at books for your next 2, then doing it with all of the above conditions being followed. So, your first 4 should be relatively relaxed in comparison to your real exams conditions, you need to work your way up to maximise the benefit of the practice exams.

**#10: Do your practice papers on paper.**

Many people do practice exams by reading off the computer screen. This seems okay for multiple choice questions, but you won't be getting the same experience as your own VCAA exams under proper exam conditions. If you're worried about the environment, print on recyclable paper. Or, if you're worried about spending money on printing, ask if you can print the exams at school or ask if your teacher can do it for you.

**#11: Get your teacher to mark and comment on all of your written answers.**

Some teachers are more willing to do this than others, however, try and make sure that your teacher is giving you enough feedback. Many students are too lenient when they mark their own work and don't realise the mistakes that they're making. It is therefore critical that you get someone else.

**#12: Keep track of your practice exam performance!**

It is extremely helpful to create a chart that monitors your performance on practice exams. You should include the name of the company and year, your score in multiple choice or short answer and most importantly, a description of all the areas you got incorrect. By doing so, you can pinpoint your weakest areas. Review and address these pain points before moving on to your next practice exam. We also highly recommend getting a small exercise book to write down any new knowledge you've gained from a practice exam and any mistakes you've been making. This is extremely important because it's very easy to forget something you only briefly read about in the solutions to a practice exam. Keep it altogether in the one place.

**#13: After the exam, move onward and upward.**

It is very easy to fall into this trap if you are in Year 12. Just remember that completing the 2.5-hour exam is an accomplishment in itself, so don't stress about what you did right or wrong. Instead, direct your focus on your next exam and invest your energy in positive thoughts!

## Top exam tips

### **#1: On the day of your exam it is okay to still go over content.**

We don't recommend frantically cramming on the day, however, you should read lightly over 1 or 2 concepts that you've been having the most trouble with and try a few written questions to get you into the zone.

### **#2: Define abbreviations (such as CR) in your exam.**

You should always write the full term, and then put the abbreviation in brackets beside it and then you can use the abbreviation for the rest of your response.

E.g., "...conditioned response (CR)..."

### **#3: Spelling mistakes matter for psychology terms.**

Marks aren't taken off for spelling incorrectly, so for all of you who aren't good spellers, don't panic (save your worries about spelling for English)! However, if your incorrectly-spelled word actually forms another word, then you will not get any marks.

E.g., writing "conditioner" instead of "conditioning".

### **#4: Have a gameplan for whether you do MC or SA first in an exam.**

This will differ from person to person and depends a lot on personal preference.

Try out different options and see which one works best for you, then stick with that option for your practice exams and actual exam. However, if you're not sure about what you want to do, start with multiple choice as it can jog your memory whilst giving you a confidence boost at the beginning of your exam.

You may also get through multiple choice much quicker than you expected, leaving more time for short-answer.

### **#5: Learn plenty of examples.**

Too often students are caught up in learning dozens of definitions and forget about learning examples for terms as well. Make sure you are prepared with a few examples of everything you've learnt so you can provide these in the exam.

### **#6: Appease your examiner by going with the norm.**

Do NOT try to create new and interesting examples for your assessors in the exam – stick with the ones you've seen before in your textbook. An assessor would much rather see a typical example that everyone knows rather than a new one, because they may be unfamiliar with it and thus not be willing to give it full marks or they might just disapprove because it's not the "norm".

**#7: Make the most of reading time.**

Most students use reading time as a “glossing over” period without processing any of the questions at a deeper level. Try to answer as many questions in your head during reading time so that you can quickly remember them for the short-answer section.

**#8: Check over your written responses if you get time.**

This seems like a given, but many students do not check over their written answers and this almost always leads to a loss of easy marks. It’s very easy in the pressure of an exam to skip key words or write incorrect ones simply due to the speed at which you’re answering the questions.

E.g., describing the biopsychosocial framework as containing “biological, psychological and psychological factors”, instead of biological, psychological and social factors.

**#9: If you crossed something out and want to use it again, you must rewrite it!**

It is VCAA policy that anything crossed out cannot be read or assessed, even if it says “please read this” beside it. So, you must rewrite something if you have crossed it out and want to use it again.

Also, VCAA examiners do not read anything that is not written on a line or extends beyond the border of the page. Therefore, once you approach the end of the last line of an answer, write (cont’d) like this and flick to the back of the exam booklet and continue your response in the extra writing space. Quote your question number and part (e.g., 1d) and continue your response there. Examiners will know what you’re doing!

**#10: Don’t use the word you’re defining in your definitions.**

Most of the time this is true, so definitely avoid doing it wherever possible because it’s a really silly mistake to make. The word that is specific to the concept cannot be reused.

E.g., using “observing” when defining “observational learning” may not be so appropriate.

**#11: If faced with something you haven’t seen before, answer it using the knowledge you do have!**

In the 2011 exam, a number of students complained that for major depression they were never specifically taught the strengths and limitations of CBT.

There will be questions on your exam that require you to deduce answers from your knowledge, rather than just rote learning and regurgitating information. Be one of those students who rises to the challenge and successfully comes up with a great answer from logical reasoning, because you understand the course content so well!

**#12: Ensure all your written responses are applied to the case study.**

If you read any assessor's report, you'll see how much the chief assessor stresses this point. It's very important. How can you do this? Use the person's name wherever possible and make your explanation specific to the situation described in the case study.

**Most tested concepts**

Concept tested	Tasks
<b>Central Nervous System and Peripheral Nervous System</b>	<ul style="list-style-type: none"> <li>Outline the subsystems of each nervous system.</li> <li>Identify which system would be activated in a given scenario and why.</li> <li>Explain the physiological effects of each specific nervous system being activated.</li> </ul>
<b>Role of the neuron</b>	<ul style="list-style-type: none"> <li>Describe the transmission of information along a neuron.</li> <li>Explain the function of glutamate and GABA.</li> </ul>
<b>Stress</b>	<ul style="list-style-type: none"> <li>Apply the Transactional Model of Stress and Coping to different scenarios; what are its strengths and weaknesses?</li> <li>Explain the different stages of General Adaptation Syndrome and apply the theory to examples.</li> </ul>
<b>Neural Basis of Learning/Memory</b>	<ul style="list-style-type: none"> <li>Outline the structural and functional changes that occur in a neuron when memories are formed.</li> <li>Explain Long Term Potentiation and Long Term Depression and how they occur.</li> </ul>
<b>Classical conditioning</b>	<ul style="list-style-type: none"> <li>Identify the UCS, NS, CS, UCR and CR in scenarios</li> <li>Outline the key processes of classical conditioning using the language of classical conditioning (UCS, CS, etc).</li> <li>List the differences between the operant and classical conditioning using language such as acquisition, etc.</li> </ul>
<b>Operant conditioning</b>	<ul style="list-style-type: none"> <li>Describe how operant conditioning can be used to change behaviour in a specific scenario.</li> <li>Identify the components of the three phase model in a scenario (ABC).</li> <li>Explain and identify reinforcement and punishment.</li> </ul>
<b>Observational learning</b>	<ul style="list-style-type: none"> <li>Apply attention, retention, reproduction, motivation and reinforcement to different scenarios.</li> </ul>

<b>Models of memory</b>	<ul style="list-style-type: none"> <li>● Outline the Atkinson-Shiffrin model of memory; identify the capacity and duration of each component.</li> <li>● Distinguish between procedural, episodic, and semantic memories.</li> <li>● Describe the role of key brain structures in the process of memory.</li> </ul>
<b>Memory</b>	<ul style="list-style-type: none"> <li>● Identify and explain recall, recognition, relearning, and reconstruction.</li> <li>● Explain context and state dependent cues and be able to identify them in a scenario.</li> <li>● Outline the reconstructive nature of memory according to research by Elizabeth Loftus.</li> </ul>

## Common questions

### Do I need to learn the textbook back to front?

No, learning the textbook back to front will not guarantee you a high score. If you could bring your textbook into the exam with you and didn't study the content too much, I can assure you that you wouldn't get greater than 90%. This is because Psychology exams feature a lot of application of content to various case studies. Around one third of your exam will ask questions specific to some type of case studies, so merely regurgitating facts will not score you full marks. Try to focus on understanding the concepts rather than learning every part of your textbook. To ensure you've understood one of the concepts you should try to explain them to someone with no knowledge of Psychology and make them understand the concept. If you can teach them properly without your notes then it's safe to say you've probably understood the content well.

### Is the study design useful?

If you had asked me this in 2010 I would say "Um yes, potentially but I have never really used it". However, due to the new course, the study design is the only concrete document you can use to determine what the examiners will be testing you on. A lot of the textbooks feature extra content that is not relevant just to cover the authors in case these extra topics are tested on the exam. Once you've finished learning a topic in class you should go through the study design and check to see if there's anything on there you're unsure about after covering the topic. If there is, ask your teacher and don't leave it too late. By the end of semester every dot point on the study design should be familiar to you and if parts aren't clear get them sorted as soon as possible.

**Are VCAA assessors really lenient or really harsh in their marking?**

Psychology assessors are, for the most part, very harsh in how they mark written responses. This ensures there's a good spread, otherwise everyone would be doing really well in Psychology. You'll notice that the average mark for the multiple-choice section is typically quite high (approximately 70-80%) with a number of students scoring full marks. If you contrast this to the written response sections, the average is quite low (approximately 50%). Your answers need to be specific, related to the case study and in special cases feature key words. If any of these are missing you will lose marks.

**If I want to get 40+ or 45+ how many practice exams should I be doing?**

For 40+, around 10-15 practice exams minimum, while for 45+, more than 20 practice exams minimum.

**What are the best practice exams for psychology?**

I'd say "Insight", "Trails for Teachers" and ACED were the three best practice exam companies for Psychology. "NEAP" was also quite good; "STAV" was okay while "TSSM" and "Lisachem" I found were not very good papers. Having said that, VCAA exams are definitely the best practice exams you could be doing out of any, and at this stage you should be completing VCAA exams.

Reviewed and edited by Fisher Day

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