

Unit 3: How does experience affect behaviour and mental processes?

The nervous system influences behaviour and the way people experience the world. In this unit students examine both macro-level and micro-level functioning of the nervous system to explain how the human nervous system enables a person to interact with the world around them. They explore how stress may affect a person's psychological functioning and consider the causes and management of stress. Students investigate how mechanisms of memory and learning lead to the acquisition of knowledge, the development of new capacities and changed behaviours. They consider the limitations and fallibility of memory and how memory can be improved. Students examine the contribution that classical and contemporary research has made to the understanding of the structure and function of the nervous system, and to the understanding of biological, psychological and social factors that influence learning and memory.

A student practical investigation related to mental processes and psychological functioning is undertaken in either Unit 3 or Unit 4, or across both Units 3 and 4, and is assessed in Unit 4, Outcome 3. The findings of the investigation are presented in a scientific poster format as outlined in the template on [page 13](#).

Area of Study 1

How does the nervous system enable psychological functioning?

In this area of study, students explore the role of different branches of the nervous system in enabling a person to integrate, coordinate and respond to internal and external sensory stimuli. They explore the specialised structures and functioning of neurons that allow the nervous system to transmit neural information. Students evaluate how biological, psychological and social factors can influence a person's nervous system functioning. In particular, they consider the ways in which stress can affect the mind and body, the role that the nervous system plays in these processes and how stress can be managed.

Outcome 1

On completion of this unit the student should be able to explain how the structure and function of the human nervous system enables a person to interact with the external world and analyse the different ways in which stress can affect nervous system functioning.

To achieve this outcome the student will draw on key knowledge outlined in Area of Study 1 and relevant key science skills on [pages 11 and 12](#) of the study design.

Key knowledge

Nervous system functioning

- the roles of different divisions of the nervous system (central and peripheral nervous systems and their associated sub-divisions) in responding to, and integrating and coordinating with, sensory stimuli received by the body
- the distinction between conscious and unconscious responses by the nervous system to sensory stimuli, including the role of the spinal reflex
- the role of the neuron (dendrites, axon, myelin and axon terminals) as the primary cell involved in the reception and transmission of information across the synapse (excluding details related to signal transduction)
- the role of neurotransmitters in the transmission of neural information between neurons (lock-and-key process) to produce excitatory effects (as with glutamate) or inhibitory effects (as with gamma amino butyric acid [GABA])
- the effects of chronic changes to the functioning of the nervous system due to interference to neurotransmitter function, illustrated by the role of GABA in Parkinson's disease.

Stress as an example of a psychobiological process

- sources of stress (eustress and distress) including daily pressures, life events, acculturative stress, major stress and catastrophes that disrupt whole communities
- models of stress as a biological process, with reference to Selye's General Adaptation Syndrome of alarm reaction (shock/counter shock), resistance and exhaustion, including the 'fight-flight-freeze' response and the role of cortisol
- models of stress as a psychological process, with reference to Richard Lazarus and Susan Folkman's Transactional Model of Stress and Coping (stages of primary and secondary appraisal)
- context-specific effectiveness, coping flexibility and use of particular strategies (exercise and approach and avoidance strategies) for coping with stress.

Area of Study 2

How do people learn and remember?

Memory and learning are core components of human identity: they connect past experiences to the present and shape futures by enabling adaptation to daily changes in the environment. In this area of study students study the neural basis of memory and learning and examine factors that influence the learning of new behaviours and the storage and retention of information in memory. They consider the influence of biological, psychological and social factors on the fallibility of memory.

Outcome 2

On completion of this unit the student should be able to apply biological and psychological explanations for how new information can be learnt and stored in memory, and provide biological, psychological and social explanations of a person's inability to remember information.

To achieve this outcome the student will draw on key knowledge outlined in Area of Study 2 and relevant key science skills on [pages 11 and 12](#) of the study design.

Key knowledge

Neural basis of learning and memory

- neural plasticity and changes to connections between neurons (including long-term potentiation and long-term depression) as the fundamental mechanisms of memory formation that leads to learning
- the role of neurotransmitters and neurohormones in the neural basis of memory and learning (including the role of glutamate in synaptic plasticity and the role of adrenaline in the consolidation of emotionally arousing experiences).

Models to explain learning

- classical conditioning as a three-phase process (before conditioning, during conditioning and after conditioning) that results in the involuntary association between a neutral stimulus and unconditioned stimulus to produce a conditioned response, including stimulus generalisation, stimulus discrimination, extinction and spontaneous recovery
- operant conditioning as a three-phase model (antecedent, behaviour, consequence) involving reinforcers (positive and negative) and punishment (including response cost) that can be used to change voluntary behaviours, including stimulus generalisation, stimulus discrimination and spontaneous recovery (excluding schedules of reinforcement)
- observational learning as a method of social learning, particularly in children, involving attention, retention, reproduction, motivation and reinforcement
- the 'Little Albert' experiment as illustrating how classical conditioning can be used to condition an emotional response, including ethical implications of the experiment.

Process of memory

- the multi-store model of memory (Atkinson-Shriffin) with reference to the function, capacity and duration of sensory short-term and long-term memory
- interactions between specific regions of the brain (cerebral cortex, hippocampus, amygdala and cerebellum) in the storage of long-term memories, including implicit and explicit memories.

Reliability of memory

- methods to retrieve information from memory or demonstrate the existence of information in memory, including recall, recognition, relearning and reconstruction
- the effects of brain trauma on areas of the brain associated with memory and neurodegenerative diseases, including brain surgery, anterograde amnesia and Alzheimer's disease
- the factors influencing a person's ability and inability to remember information, including context and state dependent cues, maintenance and elaborative rehearsal and serial position effect
- the reconstruction of memories as evidence for the fallibility of memory, with reference to Loftus' research into the effect of leading questions on eye-witness testimonies.

School-based assessment

Satisfactory completion

The award of satisfactory completion for a unit is based on whether the student has demonstrated the set of outcomes specified for the unit. Teachers should use a variety of assessment tasks to provide a range of opportunities for students to demonstrate the key knowledge and key skills in the outcomes.

The areas of study and key knowledge and key skills listed for the outcomes should be used for course design and the development of learning activities and assessment tasks.

Assessment of levels of achievement

The student's level of achievement in Unit 3 will be determined by School-assessed Coursework. School-assessed Coursework tasks must be a part of the regular teaching and learning program and must not unduly add to the workload associated with that program. They must be completed mainly in class and within a limited timeframe.

Where teachers provide a range of options for the same School-assessed Coursework task, they should ensure that the options are of comparable scope and demand.

The types and range of forms of School-assessed Coursework for the outcomes are prescribed within the study design. The VCAA publishes *Advice for teachers* for this study, which includes advice on the design of assessment tasks and the assessment of student work for a level of achievement

Teachers will provide to the VCAA a numerical score representing an assessment of the student's level of achievement. The score must be based on the teacher's assessment of the performance of each student on the tasks set out in the following table.

Contribution to final assessment

School-assessed Coursework for Unit 3 will contribute 16 per cent to the study score.

Outcomes	Marks allocated*	Assessment tasks
<p>Outcome 1</p> <p>Explain how the structure and function of the human nervous system enables a person to interact with the external world and analyse the different ways in which stress can affect nervous system functioning.</p>	50	<p>At least one task selected from:</p> <ul style="list-style-type: none"> • annotations of at least two practical activities from a practical logbook • evaluation of research • a report of a student investigation • an analysis of data including generalisations and conclusions • a visual presentation • media analysis/response • a response to a set of structured questions • a reflective blog/learning journal related to selected activities or in response to an issue • a test <p>(approximately 50 minutes or not exceeding 1000 words for each task)</p>
<p>Outcome 2</p> <p>Apply biological and psychological explanations for how new information can be learnt and stored in memory, and provide biological, psychological and social explanations of a person's inability to remember information.</p>	50	<p>At least one task (which is different from the type of task/s for Outcome 1) selected from:</p> <ul style="list-style-type: none"> • annotations of at least two practical activities from a practical logbook • evaluation of research • a report of a student investigation • analysis of data including generalisations and conclusions • a flow chart • media analysis/response • a response to a set of structured questions • a reflective blog/learning journal related to selected activities or in response to an issue • a test <p>(approximately 50 minutes or not exceeding 1000 words for each task)</p>
Total marks	100	

*School-assessed Coursework for Unit 3 contributes 16 per cent.

Practical work and assessment

Practical work is a central component of learning and assessment. As a guide, between 3½ and 5 hours of class time should be devoted to student practical work and investigations for each of Areas of Study 1 and 2.

External assessment

The level of achievement for Units 3 and 4 is also assessed by an end-of-year examination, which will contribute 60 per cent to the study score.

Unit 4: How is wellbeing developed and maintained?

Consciousness and mental health are two of many psychological constructs that can be explored by studying the relationship between the mind, brain and behaviour. In this unit students examine the nature of consciousness and how changes in levels of consciousness can affect mental processes and behaviour. They consider the role of sleep and the impact that sleep disturbances may have on a person's functioning. Students explore the concept of a mental health continuum and apply a biopsychosocial approach, as a scientific model, to analyse mental health and disorder. They use specific phobia to illustrate how the development and management of a mental disorder can be considered as an interaction between biological, psychological and social factors. Students examine the contribution that classical and contemporary research has made to the understanding of consciousness, including sleep, and the development of an individual's mental functioning and wellbeing.

A student practical investigation related to mental processes and psychological functioning is undertaken in either Unit 3 or Unit 4, or across both Units 3 and 4, and is assessed in Unit 4, Outcome 3. The findings of the investigation are presented in a scientific poster format as outlined in the template on [page 13](#).

Area of Study 1

How do levels of consciousness affect mental processes and behaviour?

Differences in levels of awareness of sensations, thoughts and surroundings influence individuals' interactions with their environment and with other people. In this area of study students focus on states of consciousness and the relationship between consciousness and thoughts, feelings and behaviours. They explore the different ways in which consciousness can be studied from physiological and psychological perspectives and how states of consciousness can be altered. Students consider the nature and importance of sleep and apply biological, psychological and social factors to analyse the effects of sleep disturbances on psychological functioning, including mood, cognition and behaviour.

Outcome 1

On completion of this unit the student should be able to explain consciousness as a continuum, compare theories about the purpose and nature of sleep, and elaborate on the effects of sleep disruption on a person's functioning.

To achieve this outcome the student will draw on key knowledge outlined in Area of Study 1 and relevant key science skills on [pages 11 and 12](#) of the study design.

Key knowledge

Nature of consciousness

- consciousness as a psychological construct that varies along a continuum, broadly categorised into normal waking consciousness and altered states of consciousness (naturally occurring and induced)
- the measurement of physiological responses to indicate different states of consciousness, including electroencephalograph (EEG), electromyograph (EMG), electro-oculograph (EOG) and other techniques to investigate consciousness (measurement of speed and accuracy on cognitive tasks, subjective reporting of consciousness, including sleep diaries, and video monitoring)
- changes in a person's psychological state due to levels of awareness, controlled and automatic processes, content limitations, perceptual and cognitive distortions, emotional awareness, self-control and time orientation

- changes in levels of alertness as indicated by brain waves patterns (beta, alpha, theta, delta) due to drug-induced altered states of consciousness (stimulants and depressants)
- the effects on consciousness (cognition, concentration and mood) of one night of full sleep deprivation as a comparison with effects of legal blood-alcohol concentrations.

Importance of sleep

- sleep as a regular and naturally occurring altered state of consciousness that follows a circadian rhythm and involves the ultradian rhythms of REM and NREM Stages 1–4 sleep excluding corresponding brain wave patterns and physiological responses for each stage
- theories of the purpose and function of sleep (REM and NREM) including restoration theory and evolutionary (circadian) theory
- the differences in sleep across the lifespan and how these can be explained with reference to the total amount of sleep and changes in a typical pattern of sleep (proportion of REM and NREM) .

Effects of sleep disturbances and possible treatments

- changes to a person's sleep-wake cycle and susceptibility to experiencing a circadian phase disorder, including sleep-wake shifts in adolescence, shift work and jet lag
- the effects of partial sleep deprivation (inadequate sleep either in quantity or quality) on a person's affective (amplified emotional responses) behavioural and cognitive functioning
- the distinction between dysomnias (including narcolepsy and sleep-onset insomnia) and parasomnias (including sleep apnoea and sleep walking) with reference to the effects on a person's sleep-wake cycle
- the interventions to treat sleep disorders including cognitive behavioural therapy (with reference to insomnia) and bright light therapy (with reference to circadian phase disorders).

Area of Study 2

What influences mental wellbeing?

In this area of study, students examine what it means to be mentally healthy. They explore the concept of a mental health continuum and factors that explain how location on the continuum for an individual may vary over time. Students apply a biopsychosocial approach to analyse mental health and mental disorder, and evaluate the roles of predisposing, precipitating, perpetuating and protective factors in contributing to a person's mental state. Specific phobia is used to illustrate how a biopsychosocial approach can be used to explain how biological, psychological and social factors are involved in the development and management of a mental disorder. Students explore the concepts of resilience and coping and investigate the psychological basis of strategies that contribute to mental wellbeing.

Outcome 2

On completion of this unit the student should be able to explain the concepts of mental health and mental illness including influences of risk and protective factors, apply a biopsychosocial approach to explain the development and management of specific phobia, and explain the psychological basis of strategies that contribute to mental wellbeing.

To achieve this outcome the student will draw on key knowledge outlined in Area of Study 2 and relevant key science skills on [pages 11 and 12](#) of the study design.

Key knowledge

Defining mental health

- mental health as a continuum (mentally healthy, mental health problems, mental disorders) influenced by internal and external factors that can fluctuate over time
- the typical characteristics of a mentally healthy person, including high levels of functioning, social and emotional well-being and resilience to life stressors
- ethical implications in the study of, and research into, mental health, including informed consent and use of placebo treatments.

Factors that contribute to the development and progression of mental health disorders

- the distinction between predisposing risk factors (increase susceptibility), precipitating risk factors (increase susceptibility and contribute to occurrence), perpetuating risk factors (inhibit recovery) and protective factors (prevent occurrence or re-occurrence)
- the influence of biological risk factors including genetic vulnerability to specific disorders, poor response to medication due to genetic factors, poor sleep and substance use
- the influence of psychological risk factors including rumination, impaired reasoning and memory, stress and poor self-efficacy
- the influence of social risk factors including disorganised attachment, loss of a significant relationship and the role of stigma as a barrier to accessing treatment
- the concept of cumulative risk.

Application of a biopsychosocial approach, as a scientific model, to explain specific phobia

- the distinctions between stress, phobia and anxiety; variation for individuals with stress, phobia and anxiety on a mental health continuum
- the relative influences of contributing factors to the development of specific phobia with reference to: gamma amino butyric acid (GABA) dysfunction, the role of stress response and long-term potentiation (biological); behavioural models involving precipitation by classical conditioning and perpetuation by operant conditioning, cognitive bias including memory bias and catastrophic thinking (psychological); specific environmental triggers and stigma around seeking treatment (social)
- evidence-based interventions and their use for specific phobia with reference to: the use of short-acting anti-anxiety benzodiazepine agents (gamma amino butyric acid [GABA] antagonists) in the management of phobic anxiety and relaxation techniques including breathing retraining and exercise (biological); the use of cognitive behavioural therapy (CBT) and systematic desensitisation as psychotherapeutic treatments of phobia (psychological); psychoeducation for families/supporters with reference to challenging unrealistic or anxious thoughts and not encouraging avoidance behaviours (social).

Maintenance of mental health

- resilience as a positive adaption to adversity including the relative influence of protective factors with reference to: adequate diet and sleep (biological); cognitive behavioural strategies (psychological); support from family, friends and community (social)
- models of behaviour change with reference to the transtheoretical model including the stages of pre-contemplation, contemplation, preparation, action and maintenance/relapse.

Area of Study 3

Practical investigation

The investigation requires the student to identify an aim, develop a question, formulate a research hypothesis including operationalised variables and plan a course of action to answer the question and that takes into account safety and ethical guidelines. Students then undertake an experiment that involves the collection of primary qualitative and/or quantitative data, analyse and evaluate the data, identify limitations of data and methods, link experimental results to science ideas, reach a conclusion in response to the question and suggest further investigations which may be undertaken. Results are communicated in a scientific poster format according to the template on [page 13](#). A practical work folio must be maintained by the student for record, authentication and assessment purposes.

A student-designed or adapted practical investigation related to mental processes and psychological functioning is undertaken in either Unit 3 or Unit 4, or across both Units 3 and 4. The investigation relates to knowledge and skills developed across Units 3 and 4, and is undertaken by the student using an appropriate experimental research design involving independent groups, matched participants, repeated measures or a cross-sectional study.

Outcome 3

On completion of this unit the student should be able to design and undertake a practical investigation related to mental processes and psychological functioning, and present methodologies, findings and conclusions in a scientific poster.

To achieve this outcome the student will draw on key knowledge outlined in Area of Study 3 and the related key science skills on [pages 11 and 12](#) of the study design.

Key knowledge

- independent and dependent variables and operationalisation of variables
- the psychological concepts specific to the investigation and their significance, including definitions of key terms, and psychological representations
- the characteristics of scientific research methodologies and techniques of primary qualitative and quantitative data collection relevant to the selected investigation: experiments, self-reports, questionnaires, interviews and/or use of rating scales; reliability and validity of data; and minimisation of experimental bias and confounding and extraneous variables
- ethics and issues of research including identification and application of relevant ethical, health and safety guidelines, and use of human subjects
- methods of organising, analysing and evaluating primary data to identify patterns and relationships including sources of error and limitations of data and methodologies
- models and theories, and their use in organising and understanding observed phenomena and psychological concepts including their limitations
- the nature of evidence that supports or refutes a hypothesis, model or theory
- generalisability of statistics from samples to the populations from which the sample was derived
- the key findings of the selected investigation and their relationship to psychological concepts and theories associated with neural function, consciousness, learning, memory and/or mental wellbeing
- conventions of psychological report writing and scientific poster presentation including psychological terminology and representations, standard abbreviations and acknowledgment of references.

School-based assessment

Satisfactory completion

The award of satisfactory completion for a unit is based on whether the student has demonstrated the set of outcomes specified for the unit. Teachers should use a variety of assessment tasks to provide a range of opportunities for students to demonstrate the key knowledge and key skills in the outcomes.

The areas of study and key knowledge and key skills listed for the outcomes should be used for course design and the development of learning activities and assessment tasks.

Assessment of levels of achievement

The student's level of achievement in Unit 4 will be determined by School-assessed Coursework. School-assessed Coursework tasks must be a part of the regular teaching and learning program and must not unduly add to the workload associated with that program. They must be completed mainly in class and within a limited timeframe.

Where teachers provide a range of options for the same School-assessed Coursework task, they should ensure that the options are of comparable scope and demand.

The types and range of forms of School-assessed Coursework for the outcomes are prescribed within the study design. VCAA publishes *Advice for teachers* for this study, which includes advice on the design of assessment tasks and the assessment of student work for a level of achievement

Teachers will provide to the VCAA a numerical score representing an assessment of the student's level of achievement. The score must be based on the teacher's assessment of the performance of each student on the tasks set out in the following table.

Contribution to final assessment

School-assessed Coursework for Unit 4 will contribute 24 per cent to the study score.

Outcomes	Marks allocated*	Assessment tasks
<p>Outcome 1</p> <p>Explain consciousness as a continuum, compare theories about the purpose and nature of sleep, and elaborate on the effects of sleep disruption on a person's functioning.</p>	30	<p>Analysis and evaluation of stimulus material using at least one task selected from:</p> <ul style="list-style-type: none"> • annotations of at least two practical activities from a practical work folio • comparison of different states of consciousness • a report of a student investigation • analysis of data including generalisations and conclusions • media analysis/response • a response to a set of structured questions • a reflective learning journal/blog related to selected activities or in response to an issue • a test (approximately 50 minutes or not exceeding 1000 words for each task)
<p>Outcome 2</p> <p>Explain the concepts of mental health and mental illness including influences of risk and protective factors, apply a biopsychosocial approach to explain the development and management of specific phobia, and explain the psychological basis of strategies that contribute to mental wellbeing.</p>	30	<p>Application of a biopsychosocial approach using at least one task (which is different from the type of task/s for Outcome 1) selected from:</p> <ul style="list-style-type: none"> • annotations of at least two practical activities from a practical work folio • analysis of the development of specific phobia or the maintenance of mental health • a report of a student investigation • analysis of data including generalisations and conclusions • media analysis/response • a response to a set of structured questions • a reflective learning journal/blog related to selected activities or in response to an issue • a test (approximately 50 minutes or not exceeding 1000 words for each task)
<p>Outcome 3</p> <p>Design and undertake a practical investigation related to mental processes and psychological functioning, and present methodologies, findings and conclusions in a scientific poster.</p>	30	<p>A structured scientific poster according to the VCAA template (not exceeding 1000 words)</p>
Total marks	90	

*School-assessed Coursework for Unit 4 contributes 24 per cent.

Practical work and assessment

Practical work is a central component of learning and assessment. As a guide, between 2 and 4 hours of class time should be devoted to student practical work and investigations for each of Areas of Study 1 and 2. For Unit 3, between 7 and 10 hours of class time should be devoted to the investigation to be undertaken in either Unit 3 or Unit 4, or across both Units 3 and 4, including the writing of the sections of the scientific poster.

External assessment

The level of achievement for Units 3 and 4 is also assessed by an end-of-year examination.

Contribution to final assessment

The examination will contribute 60 per cent.

End-of-year examination

Description

The examination will be set by a panel appointed by the VCAA. All the key knowledge that underpins the outcomes in Units 3 and 4 and the cross-study key science skills are examinable.

Conditions

The examination will be completed under the following conditions:

- Duration: 2.5 hours.
- Date: end-of-year, on a date to be published annually by the VCAA.
- VCAA examination rules will apply. Details of these rules are published annually in the [VCE and VCAL Administrative Handbook](#).
- The examination will be marked by assessors appointed by the VCAA.

Further advice

The VCAA publishes specifications for all VCE examinations on the VCAA website. Examination specifications include details about the sections of the examination, their weighting, the question format/s and any other essential information. The specifications are published in the first year of implementation of the revised Units 3 and 4 sequence together with any sample material.