

Units 3&4 Trial Exam 2020 – Assessment Guide

Section A – Multiple-Choice Questions

VCAA Key
Knowledge

Question

Answer guide

Use the following information to answer Questions 1-3.

Harry went to his doctor to discuss recent changes to his mobility. After a number of tests, the doctor diagnosed him with Parkinson's disease. When Harry shared the news with his daughter, she had to sit down as she felt faint.

The effects of chronic changes to the functioning of the nervous system due to interference to neurotransmitter function, illustrated by the role of dopamine in Parkinson's disease.

Question 1

Which of the following neural changes is Harry likely to exhibit?

- A. an increase in melatonin
- B. a reduction in dopamine
- C. a regeneration of neurons
- D. a loss of myelin

B *Parkinson's disease is a neurodegenerative disease that is characterised by a progressive decline in the structure and function of neurons in the substantia nigra, resulting in a reduction of dopamine being produced.*

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)

Question 2

Harry was asked to pick up a glass of water as part of the diagnostic tests. Which division of his nervous system would primarily be involved in the movement of his arm?

- A. sympathetic nervous system
- B. autonomic nervous system
- C. parasympathetic nervous system
- D. somatic nervous system

D *Harry's somatic nervous system would be responsible for sending motor (efferent) information, such as the signals to move his arms, from the brain to the skeletal muscles to pick up the glass.*

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

Question 3

Which stage or sub-stage of Selye's General Adaptation Syndrome was Harry's daughter most likely in when she first heard the news of Harry's diagnosis?

- A. resistance
- B. countershock
- C. shock
- D. exhaustion

C Selye described a typical trend of biological responses to stress over time which he called the General Adaptation Syndrome. He classified three stages: alarm reaction, resistance and exhaustion. When Harry's daughter first encounters the stressor of the diagnosis, she would have entered the alarm reaction stage and specifically the shock sub-stage, where the individual's resistance to stress falls below its normal level. This is evident when his daughter feels faint.

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])

Question 4

Identify the difference between the effects of excitatory and inhibitory neurotransmitters.

	Excitatory neurotransmitter	Inhibitory neurotransmitter
A.	increases the likelihood of the postsynaptic neuron to fire	reduces the likelihood of the postsynaptic neuron to fire
B.	increases the likelihood of the presynaptic neuron to fire	reduces the likelihood of the presynaptic neuron to fire
C.	reduces the likelihood of the postsynaptic neuron to fire	increases the likelihood of the postsynaptic neuron to fire
D.	reduces the likelihood of the presynaptic neuron to fire	increases the likelihood of the presynaptic neuron to fire

A An excitatory neurotransmitter increases the likelihood of the postsynaptic neuron to fire/generate an electrical signal (action potential), whereas an inhibitory neurotransmitter reduces the likelihood of the postsynaptic neuron to fire.

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)

Question 5

Which of the following incorrectly matches the structure to its function?

- A. myelin – speeds up neural transmission
- B. dendrites – releases neurotransmitters
- C. axon – transmits neural messages
- D. myelin – insulates the neural signal

B The dendrite of a neuron receives neural messages in the form of neurotransmitters; it does not release neurotransmitters.

Use the following information to answer Questions 6-8.

Watson and Rayner classically conditioned an emotional response of fear in Little Albert, a toddler.

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

Question 6

The part of the Little Albert's brain that is primarily responsible for the consolidation of the fear is the

- A. hippocampus.
- B. cerebral cortex.
- C. amygdala.
- D. cerebellum.

C *The amygdala is responsible for associating emotional information to memory, and thus would have been primarily responsible for the consolidation of fear.*

The 'Little Albert' experiment as illustrating how classical conditioning can be used to condition an emotional response, including ethical implications of the experiment

Question 7

Little Albert's conditioned emotional response of fear of the white rat was formed through the repeated association between the

- A. conditioned response and the conditioned stimulus.
- B. unconditioned stimulus and the unconditioned response.
- C. neutral stimulus and the unconditioned stimulus.
- D. neutral stimulus and the conditioned stimulus.

C *Learning via classical conditioning results from the repeated pairing of a neutral stimulus (e.g. white rat) with an unconditioned stimulus (e.g. a loud noise).*

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)

Question 8

The repeated presentation of a white rat with a loud noise would have likely _____ Little Albert's phobia of white rats.

- A. predisposed
- B. precipitated
- C. perpetuated
- D. protected

B *It is likely that the experimental procedure precipitated (triggered) the onset of Little Albert's phobia of white rats.*

Use the following information to answer Questions 9 and 10.
As he was walking into the chemist, Nick's wife calls him with 20 items that they need for their baby.

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

Question 9

When Nick hangs up the call, he is most likely to remember

- A. all 20 of the items.
- B. the last few items only.
- C. the middle items only.
- D. the first few and last few items.

D The items at the beginning of the list would likely be transferred into his long-term memory because he will have had time to attend to and rehearse the items on his way into the chemist, making retrieval of these items more likely. The items at the end of the list will have still been in his short-term memory making him likely to remember those items too.

Methods to retrieve information from memory or demonstrate the existence of information in memory, including recall, recognition, relearning and reconstruction

Question 10

As Nick walks around the chemist, he sees the nappy section and remembers that this was an item he needed to buy. Which method to retrieve information is this an example of?

- A. recall
- B. reconstruction
- C. recognition
- D. relearning

C Recognition involves identifying the original stored information amongst alternatives. The presence of the correct information acts as a cue for its retrieval from memory. This method to retrieve information is evident when Nick sees the nappies and remembers that this was an item he needed to buy.

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)

Question 11

The role of the axon terminal of a neuron is to

- A. generate the action potential.
- B. insulate the action potential.
- C. release neurotransmitter.
- D. receive neurotransmitter.

C The axon terminal's primary role is to store neurotransmitters which are then released into the synaptic cleft.

Use the following information to answer Questions 12-15.

When Jasmine was five-years-old, her family took her to a theme park. During their visit, a pirate surprised her multiple times by making a frighteningly loud noise, “Arrrrr!”. This shocked Jasmine and caused her to cry. Now every time Jasmine sees a pirate, or anyone dressed in costume, such as a clown, she becomes so fearful that she is unable to move.

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

Question 12

In the scenario, the conditioned stimulus was the _____ and the unconditioned response was the _____.

- A. loud noise; fear of the pirate
- B. loud noise; fear of the loud noise
- C. the pirate; fear of the loud noise
- D. the pirate; fear of the pirate

C In this scenario, the pirate has become the conditioned stimulus and the fear of the loud noise is the unconditioned response that occurred involuntarily before conditioning.

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

Question 13

Which one of the following best describes Jasmine’s fear response to clowns?

- A. spontaneous recovery
- B. stimulus generalisation
- C. stimulus discrimination
- D. extinction

B Stimulus generalisation is the tendency for another stimulus (clown) that is similar to the original conditioned stimulus (pirate) to produce a response that is similar to the conditioned response (fear).

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

Question 14

This scenario is an example of classical conditioning as opposed to operant conditioning because

- A. the learner is active.
- B. the learner demonstrates a conditioned response.
- C. the response is due to conditioning.
- D. the response is involuntary.

D Consistent with the nature of classical conditioning, Jasmine’s fear reaction is an involuntary, reflexive response in the presence of the conditioned stimulus. Options B and C are characteristics of both operant and classical conditioning.

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

Question 15

In terms of a biological stress response, explain why Jasmine was unable to move when she saw the clown.

- A. she was experiencing the freeze response because she could not respond with fight or flight
- B. she was experiencing the flight response because she could not respond with fight or freeze
- C. she was experiencing the approach response because she could not respond with the fight-flight-freeze response
- D. she was experiencing the avoidance response because she could not respond with the fight-flight-freeze response

A *The freeze response occurs when a person is so overwhelmed that they cannot respond (with fight or flight).*

Use the following information to answer Questions 16 and 17.

Trevor, a healthy 42-year-old man, fell off a ladder and sustained a severe head trauma. He lost consciousness momentarily and has been unable to recall any of the events that have occurred since the accident.

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

Question 16

Trevor still remembers his life before the accident, such as the time he travelled to France on exchange to learn French. His French would likely have been stored in

- A. his hippocampus.
- B. both his cerebral cortex and hippocampus.
- C. his cerebral cortex.
- D. neither his cerebral cortex nor hippocampus.

C *Declarative memories such as the French language are primarily stored throughout the cerebral cortex. The encoding of declarative memory occurs in the hippocampus.*

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

Question 17

If Trevor had damage to both hippocampi, he should still be able to

- A. recall the trip to the hospital.
- B. remember the names of the doctors who treated him.
- C. learn new French words.
- D. learn to use a new knitting technique.

D *Someone with anterograde amnesia such as Trevor can still learn a new motor skill (such as a new knitting technique), as this is a procedural memory that is implicit in nature. Research has demonstrated that implicit memories are not affected when damage to the hippocampus is sustained.*

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

Question 18

It is evident that long term potentiation has occurred when

- A. synaptic connections have been strengthened, resulting in enhanced synaptic transmission.
- B. synaptic connections have been strengthened, resulting in reduced synaptic transmission.
- C. synaptic connections have been weakened, resulting in enhanced synaptic transmission.
- D. synaptic connections have been weakened, resulting in reduced synaptic transmission.

A Long term potentiation (LTP) strengthens synaptic connections, resulting in enhanced synaptic transmission.

Use the following information to answer Questions 19-21.

Researchers at a university were conducting an experiment to investigate different ways to improve a person's ability to remember information. In the study, they randomly allocated participants to two groups. Group 1 was told to remember a list of words as best they could, whereas Group 2 was told to remember a different list of words by linking the words to other words they knew.

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

Question 19

Group 2's instructions demonstrated which factor that influences a person's ability to remember information?

- A. elaborative rehearsal
- B. maintenance rehearsal
- C. recognition
- D. relearning

A Elaborative rehearsal is the most effective method of rehearsal to ensure information is transferred into long-term memory, and allows for easier retrieval. This was demonstrated when the researchers asked the participants to link the words to information they had already stored in their memory.

Evaluate investigative procedures and possible sources of bias, and suggest improvements, with reference to identification of potential extraneous and confounding variables including individual participant differences, non-standardised instructions and procedures, order effects, experimenter effect and placebo effects

Question 20

After they conducted the experiment, the researchers realised that they had an issue with their investigation. Which of the following extraneous variables could have arisen due to each group being asked to remember a different list of words?

- A. placebo effect
- B. placebo
- C. non-standardised procedures
- D. experimenter effect

C Non standardised procedures were used when each group was given a different list of words. For example, one list may have been easier to remember than the other.

Use an appropriate experimental research design including independent groups, matched participants, repeated measures and cross-sectional studies

Question 21

The type of experimental research design used in this study was a/n

- A. matched participants design.
- B. repeated measures design.
- C. independent groups design.
- D. cross sectional study.

C The study used an independent group design as the two groups were separate, or independent, groups.

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

Question 22

James was writing summary notes about the different types of long-term memories. When comparing implicit to explicit memories, which of the following did he get wrong in his notes?

	Implicit	Explicit
A.	non-declarative	declarative
B.	requires conscious recollection	does not require conscious recollection
C.	involves memories that are difficult to state or describe	involves memories that can be easily stated or described
D.	knowing how	knowing that

B Implicit memories do not require conscious recollection, whereas explicit memories require conscious recollection.

Use the following information to answer Questions 23-25.

Marcelle witnessed a traumatic hit-and-run accident between a bicycle and a car on her way home from work.

The role of neurotransmitters and neuro-hormones 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).

Question 23

The neurohormone involved in the strong consolidation of Marcelle's memory of the incident is

- A. cortisol.
- B. adrenaline.
- C. GABA.
- D. dopamine.

B Witnessing the incident was a traumatic experience for Marcelle, and she would have experienced a release of adrenaline (given the activation of her sympathetic nervous system). This in turn would have triggered the activation of the amygdala which is responsible for fear. This would lead to her hippocampus being signalled to strengthen the consolidation of the incident, hence the stronger memory.

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

Question 24

As a key witness to the incident, the police asked to take Marcelle back to the scene to help her memory of the number plate of the car that drove away. Taking Marcelle back to the scene of the collision would primarily provide

- A. placebos.
- B. maintenance rehearsal.
- C. state dependent cues.
- D. context dependent cues.

D *The scene would act as a context dependent cue, as this is the specific situation (or 'context') where the memory was formed.*

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

Question 25

After coming back to the scene, the police asked her further questions. According to Loftus' research,

- A. the memory of an eyewitness cannot be manipulated, making them a highly reliable source of evidence.
- B. leading questions do not lead to the reconstruction of memories.
- C. exposure to leading questions has a positive effect on the memory of an eyewitness, as these can act as retrieval cues.
- D. memories are reconstructive in nature, and can be manipulated by leading questions.

D *Memories can be manipulated by leading questions or other information. Marcelle may reconstruct her memory of the incident based on information acquired after the event.*

Use the following information to answer Questions 26 and 27.

A sleep psychologist was conducting research into the management of jet lag. After returning to Melbourne from an overseas trip, one group of participants were required to use bright light therapy, while the control group had no intervention. All other conditions of the experiment were kept the same in both groups.

Identify and operationalise independent and dependent variables

Question 26

The use of bright light by the psychologist was

- A. an independent variable.
- B. a dependent variable.
- C. an extraneous variable.
- D. a confounding variable.

A *The use of bright light therapy is the independent variable as it was the variable that the psychologist manipulated to measure its effect on jet lag (the dependent variable).*

the interventions to treat sleep disorders including cognitive behavioural therapy (with reference to insomnia) and bright light therapy (with reference to circadian phase disorders).

Question 27

By using bright light therapy, the psychologist hoped to

- A. shift the participants' sleep-wake cycle two hours ahead of the Melbourne time zone.
- B. shift the participants' sleep-wake cycle to the time zone they had overseas.
- C. resynchronise the participants' sleep wake cycle to the Melbourne time zone.
- D. increase the participants' level of sleepiness.

C *Bright light therapy is the use of exposure to bright light at designated times to resynchronise the sleep wake circadian rhythm to the normal day/night cycle of the current time zone.*

Use the following information to answer Questions 28-30.

Ben had consumed eight standard alcoholic drinks at a party, over a short amount of time. His housemate Tom joined the party and decided not to drink, but had just finished shift work and had not slept for 24 hours.

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)

Question 28

Ben is likely in an altered state of consciousness that could be characterised as

- A. naturally occurring.
- B. induced.
- C. medicative.
- D. meditative.

B *Alcohol can induce an altered state of consciousness, which can be described as an alcohol- or drug-induced altered state of consciousness.*

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

Question 29

Ben and Tom got into an argument about who would be the safest to drive home. Research suggests that someone with a BAC of _____ would have approximately the equivalent level of cognitive functioning as someone who has been awake for _____.

- A. 0.05%; 24 hours
- B. 0.10%; 24 hours
- C. 0.01%; 24 hours
- D. 0.10%; 17 hours

B *Research indicates that drivers who have had 24 hours of sustained wakefulness make a similar number of errors on driving tests compared to drivers who have a BAC of 0.10%. This likely means that neither Ben nor his friend would be safe to drive home.*

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)

Question 30

Which of the following would best determine that Ben was in an altered state of consciousness?

- A. decreased emotional awareness
- B. increased breathing
- C. increased content limitations
- D. decreased automatic processes

A *An altered state of consciousness (ASC) involves a qualitatively different experience of consciousness compared to normal waking consciousness. As Ben had been drinking and was likely in an ASC, his emotional awareness would likely have been affected. He may also have had difficulty performing automatic processes, but these would not simply 'decrease'.*

Use the following information to answer Questions 31-32.

In the car on the way to a family holiday, three sisters sat in the back seat. Jenny was daydreaming and staring dreamily out the window, Georgia was completing a crossword puzzle on her phone, and Fran had just fallen asleep.

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)

Question 31

Which of the following would correctly describe the sisters' states of consciousness?

	Jenny	Georgia	Fran
A.	altered state of consciousness	altered state of consciousness	normal waking consciousness
B.	normal waking consciousness	altered state of consciousness	altered state of consciousness
C.	altered state of consciousness	normal waking consciousness	altered state of consciousness
D.	normal waking consciousness	normal waking consciousness	altered state of consciousness

C Jenny is daydreaming which is an altered state of consciousness; Georgia is completing a crossword puzzle which would likely occur during normal waking consciousness; and Fran had just fallen asleep which is an altered state of consciousness.

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

Question 32

Fran's psychological state would likely involve _____ compared to Georgia's.

- A. a reduction in content limitations
- B. more awareness
- C. a greater ability to accurately perceive time
- D. an enhanced ability to perform automatic processes

A In terms of content limitations, the content we hold in our mind tends to be less limited when a person is in an altered state of consciousness, as we cannot exhibit control over our thoughts while we sleep (Fran), when compared to someone in normal waking consciousness (Georgia).

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).

Question 33

Which of the following options correctly identifies a biological, psychological, and social contributing risk factor in the development of a specific phobia?

	Biological	Psychological	Social
A.	GABA dysfunction	long-term potentiation	stigma around seeking treatment
B.	role of stress response	long-term potentiation	stigma around seeking treatment
C.	role of stress response	catastrophic thinking	social support
D.	GABA dysfunction	catastrophic thinking	specific environmental triggers

D The development of a specific phobia can be viewed in terms of the biopsychosocial model. A biological contributing factor is GABA dysfunction, a psychological factor is cognitive bias, and a social factor is a specific environmental trigger. Option C is not the best option, as social support is not a contributing risk factor in the development of a specific phobia.

Use the following information to answer Questions 34 and 35.

Ken recently lost his job.

Context-specific effectiveness, coping flexibility and use of particular strategies (exercise and approach and avoidance strategies) for coping with stress

Question 34

If it was said that Ken displayed high levels of coping flexibility, this would involve him

- A. using the same coping strategy in all stressful situations.
- B. using no coping strategy for a stressful situation.
- C. adapting the stressful situation to match the coping strategy.
- D. adapting the coping strategy to match the stressful situation.

D Coping flexibility is being able to adapt a coping strategy to meet the specific demands of the stressor.

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)

Question 35

Which strategy would not show that Ken had a high level of resilience?

- A. arranging to talk to a recruiter
- B. ordering a burger and fries every night
- C. ensuring he gets adequate sleep
- D. working on updating his resume

B Resilience refers to positive adaptation to adversity. Ordering a burger and fries each night would be unlikely to help him have an adequate diet, a protective factor that can enhance resilience.

Use the following information to answer Questions 36-38.

35-year-old Sally had just given birth to a baby boy named Rory.

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).

Question 36

What approximate proportion of sleep would be REM for Rory and Sally?

	Rory	Sally
A.	20%	50%
B.	50%	20%
C.	20%	20%
D.	50%	50%

B Rory as a newborn will have around 50% of his sleep in REM, while Sally as an adult will spend approximately 20% of time in REM.

theories of the purpose and function of sleep (REM and NREM) including restoration theory and evolutionary (circadian) theory

Question 37

According to the restoration theory of sleep, REM sleep is important

- A. in order to restore psychological processes such as muscle and tissue repair.
- B. because experiencing more REM sleep at night enhances the chance of survival.
- C. in order to conserve energy and to protect from harm.
- D. in order to restore mental processes and consolidate neural pathways.

D REM sleep is thought to play an important part in psychological restoration.

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)

Question 38

Sally had been having trouble getting to sleep even once her baby was asleep. Her doctor asked Sally to keep a sleep diary for a week to review her sleeping habits, including what she ate before bed, and the time she went to bed. The type of data this sleep diary generated is

- A. secondary qualitative (time in bed) and quantitative (what she ate) data.
- B. secondary quantitative (time in bed) and qualitative (what she ate) data.
- C. primary qualitative (time in bed) and quantitative (what she ate) data.
- D. primary quantitative (time in bed) and qualitative (what she ate) data.

D Primary data is data collected firsthand. Quantitative data is numerical, whereas qualitative data is non-numerical.

Use the following information to answer Questions 39 and 40.

Gino went out one night to withdraw money from an ATM when he suddenly heard a loud banging noise, causing him to jump backwards. His heart rate increased, and he noticed his hands were shaking.

The roles of different divisions of the nervous system (central and peripheral nervous systems and their associated subdivisions) in responding to, and integrating and coordinating with, sensory stimuli received by the body

Question 39

Which division of the nervous system would have caused Gino's heart rate to increase?

- A. somatic
- B. central
- C. parasympathetic
- D. sympathetic

D An increase in heart rate is due to the activation of the sympathetic nervous system.

The distinction between conscious and unconscious responses by the nervous system to sensory stimuli, including the role of the spinal reflex

Question 40

Which of the following supports the notion that his reaction of jumping backward was a reflex?

- A. his response was performed with conscious thought
- B. his response was performed without conscious thought
- C. the brain voluntarily coordinated the response
- D. the nervous system deliberately made an adaptive response

B A reflex is an involuntary, unconscious response that occurs in response to a stimulus (loud noise).

Use the following information to answer Questions 41-43.

Alex had been suffering from sleep deprivation for the past four to six months. His lack of sleep was affecting his day to day functioning. He had recently decided it was time to see a sleep psychologist.

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)

Question 41

The sleep psychologist asked Alex to sleep overnight in a sleep laboratory so that they could investigate his sleeping problem further. Which of the following is not a characteristic of an electroencephalograph (EEG)?

- A. detects, amplifies and records the electrical activity of the brain
- B. uses electrodes placed on the scalp
- C. depicts amplitude and frequency of brainwaves
- D. measures bodily movements

D *An EEG is a device that detects, amplifies and records electrical activity of the brain, where electrodes are attached to the scalp. It does not measure movements of the body – an EMG or video monitoring can measure this.*

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)

Question 42

The sleep psychologist wanted to collect qualitative data about Alex's sleep. Which of the following could the psychologist use?

- A. an electro-oculograph (EOG)
- B. an electromyograph (EMG)
- C. video monitoring
- D. all of the above

C *An EOG and EMG collect quantitative data, whereas video monitoring can provide qualitative (non-numerical) data. For example, a video could show if Alex was prone to sleepwalking.*

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)

Question 43

To determine Alex's level of alertness after his sleep, the psychologist asked Alex to undertake a cognitive task. This involved Alex watching a 30-minute video of a safari, and pointing out whenever he saw a leopard, as quickly as possible. In other words, as soon as he recognised a leopard in the scene, Alex was required to declare that he spotted one. The psychologist also deducted points if Alex incorrectly identified another animal as a leopard. The psychologist was likely testing

- A. speed.
- B. accuracy.
- C. speed and accuracy.
- D. neither speed nor accuracy.

C Speed was likely to be tested because Alex was asked to declare that he had spotted a leopard as quickly as possible, and accuracy was tested through correctly identifying leopards in the scene.

ethical implications in the study of, and research into, mental health, including informed consent and use of placebo treatments.

Question 44

A placebo refers to

- A. an inactive substance or treatment.
- B. the expectation that a particular treatment will change an individual's thoughts, feelings or behaviours in a certain way.
- C. the participants' inability to know that a certain experimental treatment has been applied to them.
- D. the participants' and experimenter's inability to know that a certain experimental treatment has been applied to a particular group of participants.

A A placebo refers to an inactive substance or treatment, such as a sugar pill. Option B refers to the placebo effect, Option C refers to a single-blind procedure, and Option D refer to a double-blind procedure.

ethical implications in the study of, and research into, mental health, including informed consent and use of placebo treatments.

Question 45

One of the ethical issues with using a placebo treatment is that

- A. they are expensive and cannot usually be provided to all participants.
- B. they are inexpensive but must not be provided to all participants.
- C. participants in the experimental group may not get adequate treatment for a mental disorder.
- D. participants in the control group may not get adequate treatment for a mental disorder.

D If participants in the control group are given a placebo treatment, they may not be receiving adequate treatment for their condition while participating in a study.

Use the following information to answer Questions 46-47.

Mia works in the city and commutes by train.

Sources of stress (eustress and distress) including daily pressures, life events, acculturative stress, major stress and catastrophes that disrupt whole communities

Question 46

Sometimes, the train is so full that Mia has to wait for the next train. Overcrowded trains would likely be considered a

- A. life event.
- B. daily pressure.
- C. major stressor.
- D. catastrophe.

B *An overcrowded train can be best described as a daily pressure. This is because it is a relatively minor stressor that arises from everyday transactions with the environment.*

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)

Question 47

The following week, the station master announces that the train line that Mia takes is undergoing maintenance, with buses replacing trains, and her commute time increasing by an hour. Without a car, Mia is concerned that she will have to wake up even earlier to get to work on time in future. In primary appraisal, Mia would likely consider this

- A. a threat.
- B. a loss.
- C. a challenge.
- D. irrelevant.

A *In primary appraisal, Mia would likely consider the train line maintenance to be significant, stressful, and a threat to her sleep and ability to get to work on time in future.*

Use the following information to answer Questions 48-50.

Amelia is 16-years-old and has been having trouble staying focused in class. For the past few months, she doesn't feel tired at night, and also struggles to get out of bed when her alarm goes off. It appears that her entire sleep-wake cycle has shifted forward. On the weekend, she often sleeps in until 11am.

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

Question 48

Amelia is most likely experiencing

- A. jet lag.
- B. shift work sleep disorder.
- C. an ultradian phase disorder.
- D. a circadian phase disorder.

D *A circadian phase disorder involves an asynchrony between an individual's internal sleep wake cycle and the external cues that are used to induce and maintain the typical sleep-wake pattern. Amelia's internal body clock is delayed by one to two hours, which is common in adolescence.*

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

Question 49

Compared to Amelia's seven-year-old brother, it is likely that she is experiencing difficulty falling asleep due to

- A. not secreting melatonin.
- B. an early release of melatonin.
- C. a delayed release of melatonin.
- D. an increase in the secretion of melatonin.

C *Melatonin is a hormone secreted by the pineal gland in response to the absence of light. In high concentrations, it is linked to the feeling of sleepiness. In adolescence, there is a natural tendency for this hormone secretion to be delayed one to two hours compared to the normal time for someone who is not an adolescent, like her brother.*

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

Question 50

A cognitive effect of Amelia's consequent sleep deprivation could be

- A. poor problem solving.
- B. a lack of hand-eye coordination.
- C. irritability.
- D. decreased reaction time.

A *When sleep deprived, many aspects of a person's cognitive functioning are affected. This includes poor problem solving.*

Section B – Short Answer and Extended Response Questions

VCAA Key Knowledge

Question

Answer guide

A new experimental drug has raised hopes for the treatment of memory loss associated with Alzheimer's disease. Research has shown that memory loss is partially linked to levels of GABA, given that GABA appears to be able to lower background noise so that important signals in the brain can be processed more easily. The new drug is a form of a benzodiazepine and is designed to target specific GABA receptors found on neurons in key parts of the brain, such as the hippocampus. The drug could be taken as a daily pill by over-55s if clinical trials show that the medicine is safe and effective at preventing memory loss.

Adapted from www.theguardian.com/science/2019/feb/14/new-drug-hopes-reversing-memory-loss-old-age-depression-schizophrenia-alzheimers

Apply ethical principles when undertaking and reporting investigations, including consideration of the role of the experimenter, protection and security of participants' information, confidentiality, voluntary participation, withdrawal rights, informed consent procedures, use of deception in research, debriefing and use of animals in research.

Question 1a (3 marks)

Explain the informed consent procedure for patients with Alzheimer's disease to participate in the clinical trials proposed by the researchers.

Answer:

- *As the patients will have different stages of Alzheimer's disease, they may not all have the cognitive capacity to make the decision to participate. Therefore, it is necessary to gain consent from the person's legal guardian.*
- *Both the participant and their legal guardian should have the research aims explained to them in plain language (including the procedures and participants' rights) as well as the potential risks/harms associated with the research.*
- *Consent should then be documented in a written consent form.*

Marking protocol:

One mark for each of the above points.

Select appropriate sampling procedures for selection and allocation of participants including random sampling, stratified sampling, convenience sampling and random allocation of participants to groups.

Question 1b (1 mark)

Describe a method that the researchers may use to randomly allocate the participants.

Answer:

- *The researchers could put all of the names of the participants into a hat, alternately drawing names to divide participants into the control group or the experimental group.*

Marking protocol:

One mark for the above point.

Note: Any other description of random allocation (where participants have an equal chance of being selected for the experimental or control groups) should be awarded a mark.

Select appropriate sampling procedures for selection and allocation of participants including random sampling, stratified sampling, convenience sampling and random allocation of participants to groups.

Question 1c (1 mark)

Explain the purpose of using a control group in the study.

Answer:

- *The control group provides a baseline measure, so that the effectiveness of this new drug (provided to the experimental group) can be measured and compared to the responses of the control group.*

Marking protocol:

One mark for the above point.

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]).

Question 1d (4 marks)

With reference to GABA and its effects on the nervous system, outline the processes involved in successful neural transmission once the neural impulse has reached the axon terminal. In your response, refer to the lock-and-key process.

Answer:

- *When the neural impulse has reached the axon terminal of the presynaptic neuron, a release of the neurotransmitter (GABA) into the synapse occurs.*
- *The neurotransmitter has a chemically distinct shape which acts as a 'key'. The complementary receptor site (on the postsynaptic neuron's dendrite) acts in the same way as a 'lock' (that can be affected by the specific 'key' of GABA).*
- *When the neurotransmitter reaches the postsynaptic neuron, it binds with the specific receptor site, which corresponds to the shape of the neurotransmitter.*
- *GABA, as an inhibitory neurotransmitter, makes the postsynaptic neuron less likely to 'fire' (i.e., generate an action potential), which causes a calming effect on the nervous system.*

Marking protocol:

One mark for each of the above points.

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.

Question 1e (3 marks)

Identify three key biological changes associated with Alzheimer's disease.

Answer:

- *An accumulation of amyloid plaques (interfering with neural communication).*
- *Neurofibrillary tangles (associated with neuronal death).*
- *A reduction in acetylcholine (a neurotransmitter which has a role in memory and learning).*
- *Brain atrophy (shrinkage of the brain/loss of neurons).*

Marking protocol:

One mark for any of the above points, to a maximum of three.

Brothers Ivan and Hank are escaping their war-torn country, and moving to Australia. Ivan is stressed about his future, especially because he does not speak English fluently, while Hank is excited by the new opportunities that migrating will bring.

Sources of stress (eustress and distress) including daily pressures, life events, acculturative stress, major stress and catastrophes that disrupt whole communities.

Question 2a (1 mark)

Identify the likely source of stress for Ivan moving to Australia, given that he does not speak English fluently.

Answer:

- *The likely source of stress for Ivan is acculturative stress, as he is moving to an English-speaking country.*

Marking protocol:

One mark the above point.

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).

Question 2b (3 marks)

Explain primary appraisal in Lazarus and Folkman's Transactional Model of Stress and Coping, and use this to explain why Ivan and Hank may have appraised the situation (of moving to Australia) differently.

Answer:

- *Primary appraisal involves evaluating the significance of an event. It may be considered stressful, irrelevant or benign/positive. If it is considered to be stressful, then a second judgment of the stressor occurs; the stressor could be considered in terms of a threat, harm/loss and/or a challenge.*
- *Ivan has likely made a primary appraisal of moving to Australia as being stressful and a threat because he can see the potential effects this migration might have on his future.*
- *On the other hand, Hank has likely made a primary appraisal of the situation as being a challenge. He can see the potential for personal growth in the new opportunities that migrating to Australia will bring.*

Marking protocol:

One mark for each of the above points.

Context-specific effectiveness, coping flexibility and use of particular strategies (exercise and approach and avoidance strategies) for coping with stress.

Question 2c (2 marks)

Define approach strategies, using an example that could help Ivan reduce his levels of stress.

Answer:

- *An approach strategy involves a person actively and directly dealing with the stressor and its effects in a constructive way to help minimise the long-term persistence of the stressor.*
- *Ivan could attend English classes to help him learn the new language and allow him to be able to communicate effectively.*

Marking protocol:

One mark for each of the above points.

Note: any other approach strategy that directly helps Ivan to reduce his level of stress (e.g., practising his English with locals, speaking to a social worker for support with finding a job) should be awarded one mark.

Context-specific effectiveness, coping flexibility and use of particular strategies (exercise and approach and avoidance strategies) for coping with stress.

Question 2d (2 marks)

Evaluate the effectiveness of using an avoidance strategy to manage Ivan's stress of speaking English.

Answer:

- *Though avoiding the stressor of speaking English may reduce Ivan's stress in the short term...*
- *an avoidance strategy can prevent Ivan from responding constructively, meaning the stressor is likely to persist in the long term.*

Marking protocol:

One mark for each of the above points.

the distinctions between stress, phobia and anxiety; variation for individuals with stress, phobia and anxiety on a mental health continuum.

Question 2e (2 marks)

Hank is also experiencing stress. How would you differentiate stress from anxiety?

Answer:

- Stress is a state of both physiological and psychological arousal that is due to external stressors that are perceived by Hank to exceed his ability or resources to cope. Stress can manifest as both distress and eustress, and usually has a known cause.
- On the other hand, anxiety (involves similar physiological changes to stress, but) is only distressful and may not have a known cause.

Marking protocol:

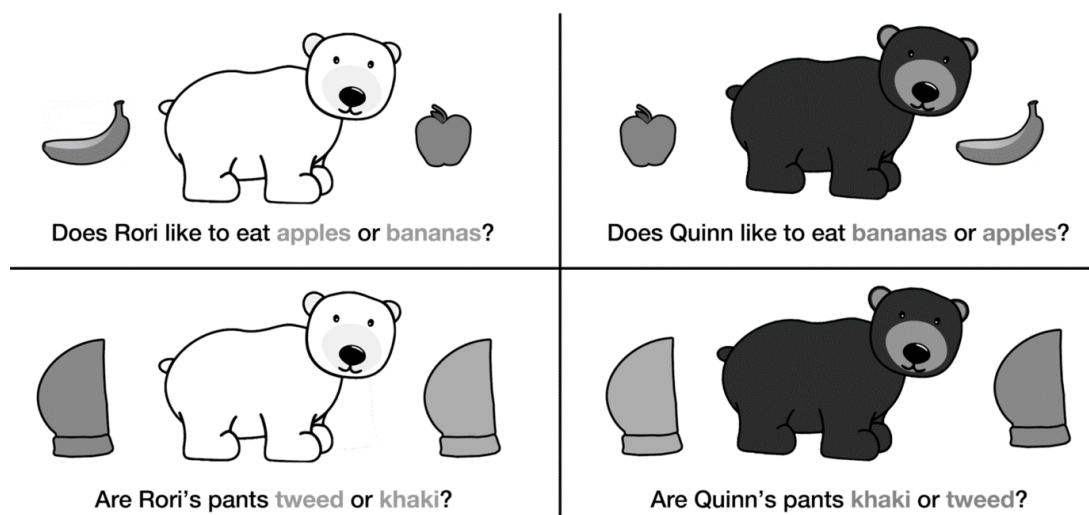
One mark for each of the above points.

Note: that the answer must include a comparison term (such as, "whereas," "while," "in contrast", etc.). If no comparison term is provided, the maximum mark for this question is one mark.

Researchers have found that children under three-years-old have greater limitations in their short-term memory capacity and duration when compared to adults. It appears that toddlers are unable to remember two choices sufficiently well to compare them and respond, so instead, they simply echo the last choice they hear.

In an experiment, 30 two-year-old toddlers from a local childcare centre were asked a set of 20 two-choice questions, without any prior context. The questions first involved a polar bear named Rori, and included questions such as, "Does Rori like to eat apples or bananas?". No prior information was given about Rori preferring to eat apples or bananas.

After the 20 questions were asked, the researchers then posed the questions over again to the same toddlers, but the order of the options was switched around, utilising a grizzly bear named Quinn; for example, "Does Quinn like to eat bananas or apples?". Again, no prior context about Quinn was provided.



In response to these questions, the toddlers picked the second option 85% of the time, and that was true no matter whether the bear was Rori or Quinn. The responses of the children led the researchers to conclude that toddlers' short-term memory is more limited than that of adults.

Adapted from www.sciencealert.com/scientists-might-have-found-the-ideal-way-to-get-your-toddler-eating-what-you-want

Identify and operationalise independent and dependent variables.

Question 3a (1 mark)
Identify the dependent variable in the research investigation.

Answer:

- *The dependent variable was the percentage of times the second option was chosen (or the response by the toddler as either the first or second option in answer to the question).*

Marking protocol:

One mark for the above point.

Use an appropriate experimental research design including independent groups, matched participants, repeated measures and cross-sectional studies.

Question 3b (2 marks)
What type of experimental research design was used in the investigation? State one advantage of this design.

Answer:

- *Experimental research design: repeated measures design.*
- *Advantage: it helps to control for individual participant differences (such as the toddlers' own preference for a particular type of fruit which may have led them to believe that the bears also liked the same fruits).*

Marking protocol:

One mark for each of the above points.

The multi-store model of memory (Atkinson-Shiffrin) with reference to the function, capacity and duration of sensory short-term and long-term memory.

Question 3c (2 marks)
The study found that young children had a limited short-term memory. What is the typical adult capacity and duration of short-term memory?

Answer:

- *The capacity of short-term memory (STM) is widely accepted to be between 5-9 (7 ± 2) units of information.*
- *STM also has a limited duration where information is held for a brief amount of time of approximately 12-20 seconds.*

Marking protocol:

One mark for each of the above points.

The multi-store model of memory (Atkinson-Shiffrin) with reference to the function, capacity and duration of sensory short-term and long-term memory.

Question 3d (3 marks)
Predict the approximate percentage of times the second option would be chosen if 30 adults were asked the same 20 questions, also without any prior context about the bears, and use this to explain the conclusion the researchers made regarding the limited capacity and duration of the short-term memory of toddlers.

Answer:

- *Adults would likely pick the second option approximately 50% of the time (as information would not be displaced/decayed from their short-term memory (STM), and they would typically show no preference either way; e.g., given there is an equal chance of Rori/Quinn liking apples/bananas).*
- *The researchers could conclude that toddlers have a more limited capacity and duration of STM than adults because the toddlers picked the second option 85% of the time, which is likely to be significantly higher than the adults. This may be due to the first option being displaced (and therefore forgotten) from the toddlers' STM (due to the relatively low capacity of toddlers' STM), or...*
- *...due to the first option decaying (and therefore being forgotten) from the toddlers' STM (due to the relatively low duration of toddlers' STM) given the time taken to ask the whole question.*

Marking protocol:

One mark for making an appropriate prediction, one mark for explaining the results in relation to capacity, and one mark for explaining the results in relation to duration.

Use basic principles of reliability and validity in evaluating research investigations undertaken

Explain the merit of replicating procedures and the effects of sample sizes in obtaining reliable data

Question 3e (2 marks)

Discuss the validity of the results and the researchers' ability to generalise their findings.

Answer:

- *Potential extraneous variables in the experiment (such the toddlers' ability to comprehend the questions, particularly given the lack of context) may threaten the (internal) validity of the conclusion.*
- OR
- *The small sample size used in this experiment may not be representative of the population, which threatens (external) validity.*
 - *Therefore, researchers are unlikely to be able to generalise the results to all toddlers.*

Marking protocol:

One mark for one of the first two points, and one mark for the final point.

Leo has been involved in several car accidents, with the most recent one being particularly distressing. Six months ago, he hit a parked car, which resulted in him breaking his leg. However, his recollection of the event was that the accident was far more traumatic than it actually was; he thought that he had sustained multiple fractures, but in fact, he only sustained one.

It also upsets Leo that he has not fully recovered, mainly because he avoids doing the exercises recommended by his physiotherapist. Leo has been generally scared of driving, but since the most recent accident, he has been too afraid to drive at all, has avoided getting into cars as a passenger, and walks to places as much as possible. Just thinking about driving makes him feel very anxious.

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)

Question 4a (2 marks)

Explain what is meant by a cognitive bias, with reference to an example in the scenario.

Answer:

- *A cognitive bias is a mistaken, flawed or distorted thinking process.*
- *Memory bias (a form of cognitive bias and psychological risk factor) is evident in the scenario; Leo believes that he sustained multiple fractures, when in fact, he only sustained one. (This appears to amplify his risk for developing or maintaining a phobia of cars.)*

Marking protocol:

One mark for each of the above points.

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)

Question 4b (6 marks)

Leo is diagnosed with a specific phobia of cars. Explain how Leo's phobia of cars may have been precipitated through classical conditioning. In your response, refer to all elements of classical conditioning.

Answer:

- *Before conditioning, prior to the car accidents, cars were a neutral stimulus (NS) for Leo.*
- *Car accidents, the unconditioned stimulus (UCS)...*
- *...generated the unconditioned response (UCR) of fear of car accidents.*
- *During the conditioning phase, Leo experienced repeated presentations of cars (NS) followed by car accidents (UCS).*
- *After conditioning, cars became a conditioned stimulus (CS)...*
- *...that automatically generated the conditioned response (CR) of fear of cars.*

Marking protocol:

One mark for each of the above points: UCS, UCR, NS, CS, CR and a description of the acquisition process (repeated associations between NS followed by the UCS).

Note that the three phases of classical conditioning do not need to be named to be awarded full marks for the question.

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] agonists) 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).

Question 4c (3 marks)

Explain how a psychologist could use cognitive behavioural therapy (CBT) to assist Leo with his phobia of cars.

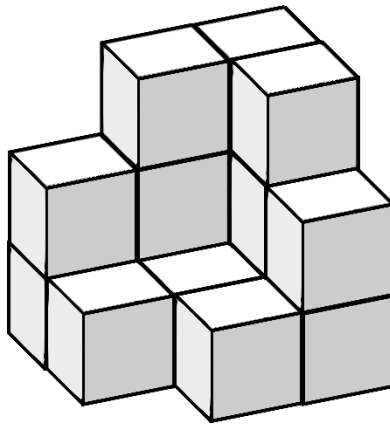
Answer:

- *Cognitive behavioural therapy (CBT) uses cognitive and behavioural strategies to change unhelpful/maladaptive thoughts and behaviours associated with a phobia. Positive changes in cognitions can often help to change behaviours to become more adaptive, and vice versa.*
- *First, the psychologist could help Leo to gather realistic information about the risks of driving, helping him to understand that driving with care and concentration is unlikely to be dangerous.*
- *The psychologist could then use these changes in thinking to help Leo to develop more adaptive behaviours, such as driving with care and concentration, or using a relaxation technique to help him overcome his fear of cars.*

Marking protocol:

One mark for each of the above points; outlining a cognitive therapy, outlining a behavioural therapy, and linking the therapies together (i.e. that changing cognitions can affect behaviours, and/or vice versa).

Dr Jung wanted to test the effect of age on a memory task. She presented a particular structure of 16 identical blocks (illustrated below) to 500 participants to memorise. Group A consisted of 250 Grade 1 students, and Group B consisted of 250 Year 12 students. She then knocked down the structure and asked the participants to replace all of the blocks to form the original block structure as quickly as they could.



Source: https://www.clipartmax.com/middle/m2H7d3G6H788m2_find-the-area-of-a-rectangle-line-cuboid-tetris-toy-block-3d/

Methods to retrieve information from memory or demonstrate the existence of information in memory, including recall, recognition, relearning and reconstruction

Question 5a (2 marks)

Identify the method of retrieval that best describes the task that Dr Jung's participants used. Justify your answer.

Answer:

- *Dr Jung's participants used reconstruction as a method of retrieval.*
- *Reconstruction as a method of retrieval requires participants to piece together (or 'reconstruct') an original stimulus that has been broken down, such as the original configuration of the block structure.*

Marking protocol:

One mark for each of the above points.

independent and dependent variables and operationalisation of variables

Question 5b (2 marks)

Operationalise the independent variable of Dr Jung's study.

Answer:

- *The independent variable is age/year level, operationalised as either being in Grade 1 or Year 12.*

Marking protocol:

Two marks for stating both age groups utilised in the study. One mark for stating one of the age groups. No marks awarded if the independent variable is only identified, but not operationalised.

use an appropriate experimental research design including independent groups, matched participants, repeated measures and cross-sectional studies

Question 5c (2 marks)

Which form of research design did Dr Jung employ? Justify your answer.

Answer:

- *Dr Jung employed a cross-sectional study.*
- *A cross-sectional study utilises existing groups, such as Grade 1 and Year 12 students (as they cannot be randomly allocated [as per an independent groups design] to Group A or Group B due to the nature of these groupings).*

Marking protocol:

One mark for each of the above points.

The results are presented in the table below.

	Group A (Grade 1 students)	Group B (Year 12 students)
Average time taken (in seconds)	200	14
Standard deviation	179	0.01

organise, present and interpret data using tables, bar charts, line graphs, percentages, calculations of mean as a measure of central tendency and understanding of standard deviation as a measure of variation around the mean

Question 5d (2 marks)

What do the standard deviations suggest about the variability in participants' responses in Group A, as compared to Group B?

Answer:

- *This standard deviation of Group A (179) suggests that there was a higher level of variability in the participants' responses (time taken to reconstruct the original block structure) ...*
- *...compared to Group B (0.01).*

Marking protocol:

One mark for each of the above points.

use basic principles of reliability and validity in evaluating research investigations undertaken

Question 5e (2 marks)

Are Group A's results or Group B's results more reliable? Justify your answer.

Answer:

- *Group B's results are more reliable (as an indicator of their cohort's ability to complete the reconstruction task) than Group A's results.*
- *This is because there is very little variability (or very high consistency) in their results as indicated by the small standard deviation (i.e., nearly all of the participants in Group B took very close to 14 seconds to complete the task).*

Marking protocol:

One mark for each of the above points.

In her highchair, 14-month-old Millie finished her meal and threw her bowl onto the ground and smiled. This led both her mum and dad to laugh in surprise, because Millie was previously unable to hold the slippery bowl in her hands. Millie now throws her bowl onto the ground each time she finishes her meal.

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).

Question 6a (4 marks)

Using the language of operant conditioning, describe why Millie continues to throw her bowl onto the ground each time she finishes her meal.

Answer:

- *Antecedent: Millie finishing her meal.*
- *Behaviour: Millie throwing her bowl onto the ground.*
- *Consequence: Her parents laughing in surprise was a form of positive reinforcement for Millie, which led to the strengthening of this behaviour (throwing her bowl) in future.*

Marking protocol:

One mark for each of the above points which link each key phase of operant conditioning to Millie's behaviour.

One mark for referencing the key term 'positive reinforcement'.

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.

Question 6b (3 marks)

Describe how the central and somatic nervous systems coordinate Millie's response of throwing her bowl onto the ground.

Answer:

- *Sensory information such as the slippery feel of the bowl would be relayed by the somatic nervous system (SNS) to the central nervous system (CNS).*
- *The brain (as part of the CNS) would process the sensory information and integrate this with other information (such as past experience) to initiate a motor response (of throwing her bowl onto the ground).*
- *This motor response would be relayed by the SNS to skeletal muscles to enable Millie to throw her bowl onto the ground.*

Marking protocol:

One mark for each of the above points.

Note: abbreviations should not be used unless they are clearly defined within a response.

Daniel had been watching his mother play tennis since he was a baby. He looked up to his mother and thought she was the best tennis player at her club. She was actually very successful and often won her games. During a Physical Education (PE) class in Grade 4, Daniel picked up a tennis racquet and swung it successfully, without being taught by the PE teacher. The teacher was surprised at how well he could swing at the ball for the first time, and congratulated Daniel with a high-five. Over the next few weeks, Daniel repeatedly practised the swing to improve his technique with the guidance of his teacher.

Observational learning as a method of social learning, particularly in children, involving attention, retention, reproduction, motivation and reinforcement.

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.

Question 7 (10 marks)

Describe how observational learning and neural plasticity could help Daniel to develop and refine his tennis swing, and evaluate the effectiveness of social learning in developing new skills when compared to other models of learning.

Answer:

- *Observational learning is a method of social learning, which involves watching the actions and consequences of a model's behaviour and using this to guide future behaviour.*
- *When Daniel watched his mother play tennis as a child (and often win) he used this to guide his own behaviour (a form of observational learning).*
- *Learning through observation involves a sequence of processes: attention, retention, reproduction, motivation and reinforcement. All are essential if observational learning is to occur.*
- *First, the learner (Daniel) must pay active attention to the model; in this case, Daniel's mother as she played tennis.*
- *Next is retention, where Daniel must remember how to swing the tennis racquet to hit the ball, and create a mental representation of this.*
- *This is followed by reproduction, where he must have both the physical and mental ability to swing the tennis racquet at the appropriate time.*
- *Motivation refers to having the desire to perform the behaviour; in this case, it was to perform the tennis swing in Daniel's PE class in the hope of praise from his PE teacher or his classmates.*
- *Reinforcement could have been given through the high-five from his PE teacher, or could have occurred vicariously when seeing his mother play and win her games, which would encourage Daniel to*

repeat this behaviour in future.

- *The effectiveness of observational learning is enhanced when a model is reinforced (such as when Daniel's mother won her games), perceived positively, respected, and is familiar to the observer. This is the case when Daniel watches his mother play tennis and would have increased the likelihood of the success of the observational learning.*
- *Neural plasticity refers to our brain being able to change due to experience, and is the biological basis of learning. These changes can be observed as multiple neurons connect to form neural pathways as a result of experience, such as practising a tennis swing.*
- *Long-term potentiation (LTP) refers to the long-lasting strengthening of new synaptic connections. Specifically, it refers to the ability of two neurons — a presynaptic and a postsynaptic neuron — to communicate more effectively with one another at the synapse. The more frequently they communicate, the more this connection is enhanced and strengthened. This can be seen through increased release of neurotransmitters, increased amount of receptor sites, and the sprouting of dendritic spines/axon terminal branches, leading to a greater number of synapses (known as synaptogenesis) between the presynaptic and postsynaptic neurons.*
- *In Daniel's case, LTP would have occurred while watching his mother play tennis, and then strengthened further over the weeks that his PE teacher helped him to refine his tennis swing. Stimulation of the neural pathways and synaptic connections responsible for the tennis swing would have progressively strengthened these pathways and connections, as Daniel continued to practice.*
- *On the other hand, long-term depression (LTD) refers to a long-lasting weakening of synaptic connections that occurs if there is repeated low intensity (sub-threshold) stimulation of the post-synaptic neuron. This can be seen through a decreased release of neurotransmitters, decreased amount of receptor sites, and the pruning of synapses.*
- *LTD would have occurred as any errors in Daniel's swing technique was weakened through the lack of stimulation of the neural pathways responsible for these errors. A lack of practice of these errors would lead to a progressive weakening of the synaptic connections responsible for these errors.*
- *Both LTP and LTD are important in the learning process. LTD is important so that the pruning of unimportant and unwanted connections can occur, leaving only the important connections that have been strengthened through LTP. Both LTP and LTD help to Daniel refine his tennis swing technique.*
- *Observational/social learning is particularly effective in the acquisition of skills, which are difficult to articulate in words, and form implicit, procedural memories.*

- *Bandura, the psychologist who proposed social learning theory, suggests that learning would be exceedingly laborious/difficult if people had to rely solely on the consequences of their actions (through operant conditioning) in order to learn. Learning a new skill through operant conditioning would be more time consuming due to the trial-and-error that would likely need to occur as Daniel swings his racquet. However, through observational learning, Daniel can quickly learn the correct procedure of the tennis swing by watching his mother/PE teacher perform the skill.*
- *Furthermore, learning a new skill such as a tennis swing is likely to be impossible in classical conditioning, as only reflexes can be classically conditioned. Therefore, it would not be possible to use classical conditioning to learn a relatively complex and voluntary action, such as the tennis swing.*

Marking protocol:

This question is marked holistically out of a total 10 marks. Outstanding responses will:

- Explain observational learning (relevant to the scenario).
- Identify and describe each of the five processes of observational learning based on the information provided in the scenario.
- Demonstrate an understanding of long-term potentiation and long-term depression.
- Discuss the refinement of the tennis swing in terms of neural plasticity.
- Evaluate the effectiveness of observational learning.
- Ensure that the response relates to the information provided and is not a generic answer.

Above is an example of a response that would achieve 10 marks.

The following dot points list the criteria that are outlined in the 2017-2021 VCE Psychology exam specifications for the marking of 10-mark questions. In terms of this criteria, a 10-mark answer would:

• identification and explanation of formal psychological terminology relevant to the question	Explicitly name and explain each of the five phases in observational learning and both long-term potentiation and long-term depression.
• use of appropriate psychology terminology	Use key terms from the study design relevant to the question.
• discussion of relevant psychological information, ideas, concepts, theories and/or models and the connections between them	Outline the observational learning model in relation to the scenario. Link the notion of practice and long-term potentiation.
• analysis and evaluation of data, methods and scientific models	Evaluate the effectiveness of using observational/social learning to learn a new skill as opposed to other models of learning.
• drawing of evidence-based conclusions and explanation of limitations of conclusions	Draw on the information provided and relevant theories to make conclusions, such as the usefulness of observational learning in developing new skills.

STUDENT
NAME:

Use a **PENCIL** for **ALL** entries. For each question, shade the box which indicates your answer.
Marks will **NOT** be deducted for incorrect answers.
NO MARK will be given if more than one answer is completed for any question.
If you make a mistake, **ERASE** the incorrect answer – **DO NOT** cross it out.

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