

VCE PSYCHOLOGY 2023

Unit 3 & 4 Trial Examination

Assessment Guide & Suggested Responses

Section A – Multiple Choice Answers

Question	Correct Answer	Explanations and Notes
1	B	Somatic nervous system is involved in the movement of voluntary skeletal muscles, and the leg is a skeletal muscle.
2	C	A is incorrect because it refers to a 'pre-synaptic neuron' when it should be a post-synaptic neuron, B is incorrect because neurotransmitters cannot affect the responsiveness of the post-synaptic neuron (but neuromodulators can), and D is incorrect because neuromodulators exert their influence over a slower period of time (not neurotransmitters).
3	A	Classical conditioning is a passive form of learning because it is learning through repeated associations of a stimulus that previously did not cause a response. The response in classical conditioning is always involuntary, hence why it is a passive form of learning.
4	D	The hippocampus is involved in the encoding of explicit memories, neocortex is involved in the storage of explicit memories and complex procedural memories, amygdala is involved in encoding the emotional components of memories, however the question asked about the main brain structure involved so the amygdala would not be correct here. The cerebellum is involved in encoding implicit procedural memories, therefore the answer is D.
5	C	GABA is the primary inhibitory neurotransmitter. Low levels of GABA would result in more post-synaptic neurons generating action potentials (since they are not being inhibited by GABA). This causes anxiety and is often an underlying biological reason that can lead to the development and maintenance of phobias.
6	D	Dilated pupils are associated with acute stress, rather than chronic stress.
7	B	In the context of needing help with his homework, his choice to seek help from his teacher is an appropriate coping strategy for that particular situation, therefore it has context-specific effectiveness.
8	B	Western views of land/country view it as the physical landscape or vast desert, whereas Aboriginal and Torres Strait Islander Ways of Knowing view Country as alive/sentient.

9	B	Neutral stimulus is the stimulus that does not initially cause a response. Before conditioning, the supermarket logo doesn't elicit a response in Katrine.
10	C	Amygdala encodes the emotional components of memories, including fear.
11	B	Parasympathetic nervous system promotes our bodies to return to a calm state/homeostasis and a decrease in heart rate is a symptom associated with the activation of this nervous system. Katrine's parasympathetic nervous system is activated after she realises they she's no longer in danger.
12	C	In both the flight and freeze responses, the sympathetic nervous system is activated, however in the freeze response, the parasympathetic nervous system is dominant. Therefore, only C can be correct.
13	B	The capacity of short-term memory is 5-9 items, and the list has 11 names on it, which exceeds the capacity of the amount of information that can be held in short-term memory.
14	C	Formally, Alzheimer's disease cannot be diagnosed until after someone has died. There are several indicators that someone has Alzheimer's before they have died, but this cannot be officially confirmed until after death.
15	C	The scenario describes an example of observational learning, so B and D are incorrect. A is incorrect because Homer is closely observing Tom, rather than Tom observing Homer's behaviour. Therefore, C is the best option, he is motivated via vicarious reinforcement as he saw Tom being rewarded for his hard work.
16	B	Mnemonic devices assist with enhancing memory. B is correct because mnemonic devices often require the use of a retrieval cue to recall the memory. Singing the songlines will help to retrieve the memory.
17	A	All options were positive indicators that would improve mental health. However, the question required the example to be an external factor. Therefore, developing friendships and connections with peers at work is the only option that is external.
18	C	Sleep is a psychological construct, this means that most of the behaviours that happen are covert and occur internally, therefore inferences need to be made using physiological devices, or the individual needs to report on their own subjective experiences.
19	D	During NREM Stage 3 there is little muscle movements so the EMG would report low levels of activity. During REM sleep we experience muscle atonia where there is no muscle tension. This is an evolutionary response and helps to ensure that we don't act out our dreams and hurt ourselves.
20	D	A literature review involves the collation and analysis of secondary data related to other people's scientific findings and/or viewpoints in order to answer a question or provide background information to help explain observed events. Yasmin was analysing and collating secondary data from a range of sources about their findings on how phone use can influence sleeping patterns.
21	B	A simulation is used because to investigate the effects of sleep deprivation on driving ability would be too dangerous in a real-life context, so the

		research team observed the driving abilities in a controlled and artificial manner.
22	B	As Mila goes to bed early and wakes up early it is likely that she is experiencing an Advanced Sleep Phase Disorder as her sleep wake cycle has moved earlier into the night.
23	A	In adolescence the sleep wake cycle shifts, and melatonin is secreted later, which means that Pavel is likely to fall asleep later and want to wake up later too. There is no indication in the scenario that his sleep is dysregulated therefore it's unlikely that he is experiencing higher or lower levels of melatonin.
24	C	Mila is likely to experience less overall sleep, less NREM Stage 3 sleep and have shorter and more sleep cycles throughout the evening. Option D is incorrect because she is still likely to experience REM sleep and Pavel is likely to experience ~20% REM rather than ~50% REM.
25	B	For both Aggie and Jamie, the experience is stressful. However, Aggie has interpreted it as a positive form of stress and as a challenge, while Jamie is focusing on the negative aspects of the camp that could go wrong. These events haven't happened yet, so it's classified as a threat rather than harm/loss.
26	A	Newborn babies spend approximately 50% of their sleep in REM. High frequency and low amplitude brain waves (beta-like / sawtooth waves) are evident during REM sleep. Therefore, Lalika should see a great deal of this type of brain wave.
27	D	Deception can only be used when informing participants about the true nature of the study is likely to influence the results (for example, participants might say or behave in a certain way only because they know what researchers are investigating).
28	C	All of the statements are true, except for C. Stress and anxiety tend to be elicited by a wide range of factors and settings. A phobic response is triggered by a specific object.
29	B	GABA is the primary inhibitory neurotransmitter in the nervous system which means it reduces the likelihood of the post-synaptic neuron generating an action potential and firing. Glutamate is an excitatory neurotransmitter, so it increases the likelihood that the post-synaptic neuron will generate an action potential. Option C and D are both incorrect as they are hormones, not neurotransmitters.
30	C	The VCAA dot point states that a social protective factor is "support from family, friends and community that is authentic and energising." Each option had a social element, however, the only option that was authentic and energising was C.
31	B	The IV of the study was whether the participants were employed in rotational shift work, or non-shift counterparts. The experimental research design was a between subject design, as the participants were either part of the shift work group or non-shift work group. No baseline data was collected so it was not a mixed design.
32	C	Systematic and random errors should be discussed when analysing potential issues with how the data has been measured. In this case, the

		experimenters have controlled for unwanted extraneous variables so that they don't become confounding variables.
33	C	Adequate hydration and nutrition, as well as taking GABA agonists are both biological factors and not psychotherapeutic treatments. Cognitive behavioural therapy would be useful, however, B, specifically states that only one session is completed. Cognitive behaviour therapy normally needs several sessions in order to be effective. With this in mind, C was the best response.
34	A	The measurements that Dr Morse used yielded consistent levels of stress across the measurements. This indicates precision as there was agreement and consistency across the measurements. Even though measurements might be consistent, it doesn't mean that the results reflect a true value and subsequently may not demonstrate high levels of accuracy or validity. No other researcher replicated the research under different settings, with different participants, therefore reproducibility is an incorrect answer.
35	D	Phobias are intense, irrational and persistent. Her phobia of public speaking does not have an adaptive purpose, as her fear is greater than the threat associated with public speaking.
36	B	Zeitgebers are environmental cues that regulate and influence someone's circadian rhythm. Circadian rhythms follow 24- hour cycles and the sleep-wake cycle is an example of a circadian rhythm rather than an ultradian rhythm. Additionally, ultradian rhythms occur more often than every 24 hours and therefore people experience more ultradian rhythms compared to circadian rhythms.
37	D	A key component of psychoeducation is that family and friends do not encourage avoidance behaviours. They encourage the person to interact with the feared stimulus in a safe and supported way.
38	D	Having a heightened level of anxiety is an affective or an emotional response, whereas an inability to concentrate is a cognitive response. Being clumsy is a behavioural response, whereas a reduction in motivation levels is a cognitive response.
39	B	Cortisol suppresses the immune system, but it doesn't stop it. Cortisol does not activate functions that are non-essential to his survival. Kevin is in the resistance stage, not the alarm stage, and cortisol does not have a role in reducing the level of adrenaline in the bloodstream. Therefore, the answer is B, Cortisol would increase glucose in the bloodstream and help him deal with his chronic stress. It would help Kevin's body cope with the long-term stress of his new job, by increasing glucose levels so that he has more energy to respond well to the demands of the stressor.
40	B	The VCAA dot point has indicated that yarning circles are an example of fieldwork. "Fieldwork involves observing and interacting with a selected environment. It may be conducted through a range of methods, including direct qualitative and/or quantitative observations and sampling, participant observation, qualitative interviews, questionnaires, focus groups and yarning circles."

END OF SECTION A

Section B – Short Answer Questions

Below are suggested responses which do not necessarily include every possible answer.

Question 1 (10 marks)

- a. *Identification:* hippocampus [1 mark]
Explanation: hippocampus is involved in encoding explicit memories [1 mark]
- b. *Explanation:* she would be able to learn to knit as this would be an implicit procedural memory [1 mark]
 Procedural memories are encoded by the cerebellum and basal ganglia, which is not initially affected in Alzheimer’s disease. [1 mark]
- c. *Explanation regarding the location of the damage:* amyloid plaques affect neural communication between the synapses of neurons, whereas neurofibrillary tangles are due to a build-up of proteins inside the neuron that affect neural communication. [2 marks]
- d. *Identification:* mixed design [1 mark]
- e. *Identification:* informed consent (or other appropriate ethical consideration) [1 mark]
Description: If patients are experiencing symptoms of Alzheimer’s already, they may not have the capacity to give informed consent, therefore a legal guardian will need to give informed consent on behalf of the patient. [1 mark]
- f. *Explanation:* reproducibility is the extent to which results are consistent when completed under different conditions, perhaps by different experimenters. An experiment with high reproducibility means that the results are strong as they are repeatedly gained, even with changed conditions. [1 mark]

Question 2 (6 marks)

- a. *Definition:* acrostics used words that have the same first letter of each word in a sequence of words to create a small phrase/sentence. [1 mark]
Scenario link: An acrostic to remember the streets could be Oliver Might Make A Kite (or other appropriate examples). [1 mark]
Explanation of retrieval: saying the phrase (Oliver Might Make A Kite) acts as a retrieval cue to remember the street names in order. [1 mark]
- b. *Explanation:*
 First store is sensory memory. Jeremy needs to pay attention to the order of the streets. [1 mark]
 Second store is short-term memory. Jeremy needs to attach meaning to the sequence of streets in order to encode them from his short-term memory into his long-term memory, for example, by using a mnemonic. [1 mark]
 Third store is long-term memory. Jeremy will be able to retrieve the sequence of streets if they have been successfully encoded and stored in his long-term memory. [1 mark]

Question 3 (2 marks)

One of the following for similarities: Both are active forms of learning, both involving watching a model/someone who is respected/admired, both are based on relationships with others, (or another appropriate similarity). [1 mark]

One of the following for differences: Indigenous Ways of Knowing emphasises connection with Country, whereas the learning acquired through Observational Learning is based on the consequences of the behaviour. Indigenous Ways of Knowing use multimodal formats, whereas Observational Learning primarily uses watching/observing, (or another appropriate difference). [1 mark]

Note: responses must use a comparative term such as ‘whereas’ or ‘compared to’ to get full marks.

Question 4 (6 marks)

- a. *Definition of mindfulness meditation:* Mindfulness meditation involves being consciously aware and accepting of our current situation. Attention (choosing what we focus on) and acceptance (choosing how we respond to the stimuli we are attending to) help us to be mindful. [1 mark]

Explanation of one of the following ways mindfulness meditation could improve the mental wellbeing of Mr Zhang’s students:

Mindfulness meditation could improve the wellbeing of the students by

- promoting a state of calmness therefore reducing anxiety and stress.
- helping the students to learn how to regulate their emotions.
- improving their concentration and productivity levels so they don’t get overwhelmed at school.
- increasing the students’ levels of empathy and levels of connectedness with others.

(or another appropriate response) [1 mark]

Note: Some connection to Mr Zhang or his students must be present in order to achieve the mark.

- b. *Definition of adequate hydration:*

The human body is predominately made up of water, therefore it is recommended that Mr Zhang and his students have between 2-2.5 litres of water per day to ensure that their bodies are sufficiently replenished and hydrated. [1 mark]

Explanation of one of the following ways adequate hydration could improve the mental wellbeing of Mr Zhang’s students:

Adequate hydration could improve the wellbeing of the students by

- ensuring that the brain and the body have the required nutrients it needs to concentrate and function effectively at school.
- preventing dehydration which can boost the students’ mood, causing the students to be less irritable and restless.
- preventing the likelihood of developing a headache which can have a negative effect on the students’ mood and ability to concentrate in class.

(or another appropriate response) [1 mark]

Note: Some connection to Mr Zhang or his students must be present in order to achieve the mark.

- c. *Identification of the appropriate biopsychosocial factor:* Social factor [1 mark]

Outline of a strategy that he could implement:

Mr Zhang could ask students to brainstorm who within their family, amongst their friends and within their community could give authentic support to them when they are stressed about school, so that they will feel supported and energised by their interactions with this person, (other appropriate examples are acceptable). [1 mark]

Question 5 (11 marks)

- a. *Identification:* withdrawal rights is an ethical guideline. [1 mark]

Application of withdrawal rights: Max will need to inform the participants that they are able to leave the study at any time, without receiving any negative consequences or being coerced to stay. [1 mark]

- b. *Description of one strength and one limitation.*

Strengths:

- The footage can be recorded and reviewed numerous times.
- The footage can be given to different researchers to determine whether there is precision within their interpretations.
- Video monitoring can detect behaviours such as sleep walking, how frequently people wake and whether they talk in their sleep.

1 mark for mentioning one of the points above. [1 mark]

Limitations:

- Video monitoring can only record overt/observable behaviours and will miss crucial smaller and internal physiological responses that occur during sleep.
- The results may be subject to interpretation bias as they are subjectively interpreted by different researchers.

1 mark for mentioning one of the points above. [1 mark]

Note: other relevant strengths and limitations are also valid.

- c. *Identification of a suitable way to collect quantitative data:* How many times did you wake up last night? On a scale of 1-5 how well did you sleep? What time did you wake up? What was the temperature in the room when you went to bed? (other appropriate examples are acceptable). [1 mark]

Identification of a suitable way to collect qualitative data: Describe how rested you felt after last night's sleep. Outline the strategies you implemented to try and fall asleep. Describe what you had for dinner last night before you went to bed, (other appropriate examples are acceptable).

[1 mark]

d. *Identification of two of the following differences:*

A teenager will sleep fewer hours compared with a newborn baby.

A teenager will have a lower % of REM sleep compared to a newborn or A teenager will spend a larger proportion of their sleep in NREM sleep compared with a newborn. (Students cannot include both responses as they are referencing the same knowledge).

A teenager will likely have only one sleep episode whereas a newborn will sleep frequently throughout the day.

A teenager will receive fewer hours of NREM sleep compared to a newborn.

A teenager will receive fewer hours of REM sleep compared to a newborn.

1 mark per each correct difference. [2 marks]

Note: the response must refer to the teenager and newborn when discussing the difference to gain the mark.

e. *Description of what an EMG does:* The EMG, detects amplifies and records electrical activity of the muscles in the body of the participant. [1 mark]

Explanation of what would be shown in REM sleep: The EMG would show minimal activity when they are in REM, (as they experience muscle atonia/cataplexy in REM sleep). [1 mark]

f. *Identification of one of the following reasons why the participant was wrong:*

- The participant is wrong because a circadian rhythm is a biological process that occurs approximately once every 24hours.

- The participant experienced four ultradian rhythms, which are biological processes that occur multiple times within 24 hours.

1 mark for a suitable explanation. [1 mark]

Question 6 (6 marks)

a. *Description and application of memory bias:* Marnie would only recall how loud a dog's bark is and ignore other elements such as how cute and friendly they are. [1 mark]

Description and application of catastrophic thinking: Marnie would imagine the worst-case scenario and think about the situation being more threatening and dangerous. She might think that a dog will disfigure her face the next time she comes into contact with a dog. [1 mark]

b. *Description of the cognitive component:* Marnie has a number of maladaptive and biased thoughts towards dogs. She would be encouraged to catch and check her thoughts and assess whether they are realistic and logical. She would then be encouraged to challenge her maladaptive beliefs towards dogs. [1 mark]

Description of the behavioural component: Marnie will also need to address the avoidant behaviours that are perpetuating her phobia such as not returning to the park or going to a friend's house if they have a dog. [1 mark]

Acknowledgement of the interactions between cognition and behaviour:

- Marnie's adapted cognitive thoughts will help her change her behaviours towards dogs.

- Marnie's behaviours will help her address her cognitive biases.

1 mark for mentioning either of the points above. [1 mark]

- c. *Outline of one of the following limitations of CBT:*
- If there is an underlying biological reason for the development of Marnie’s phobia such as low GABA levels, CBT might not be as effective.
 - In order for CBT to be effective Marnie would need to engage in the strategies and tasks, this can be overwhelming and could be beyond her ability at this point in time.
- (other appropriate examples are acceptable).
- 1 mark for mentioning one of the points above.* [1 mark]

Question 7 (12 marks)

- a. *Explanation that Nikki may need to sleep at times that are inconsistent with her circadian rhythm. As Nikki works shift work, she will often be required to fall asleep at times that are not compatible with her circadian rhythm/ required to fall asleep at times that are inconsistent with what zeitgebers are telling the body.* [1 mark]

Role of the suprachiasmatic nucleus: She wants the darker room so that when she is asleep during the day the suprachiasmatic nucleus will receive information that there are low levels of light being detected by the eyes. [1 mark]

Acknowledgement that melatonin is released from the pineal gland: The suprachiasmatic nucleus will then send this information to the pineal gland. The pineal gland will then stimulate the release of the sleep hormone melatonin into the bloodstream. [1 mark]

Melatonin’s impact on Nikki’s sleep/sleepiness: Melatonin will make Nikki feel tired and hopefully enable her to fall sleep. [1 mark]

- b. *Identification of when she should use the light box:* She should use bright light therapy when she first wakes up. [1 mark]

Explanation referring to light as a zeitgeber: The light from the lightbox will act as a zeitgeber, as it is an external cue that will provide signals to Nikki’s brain informing her that there is light in the environment. [1 mark]

- c. *Definition of sleep hygiene:* Sleep hygiene refers to adaptive and healthy sleep habits and behaviours that can help people achieve good quality and quantity of sleep. Subsequently this can improve their mental wellbeing and health. [1 mark]

Outline two of the following ways in which Nikki could improve her sleep hygiene.
1 mark each from any two examples below.

Blue light:

-She should ensure that she doesn’t use her phone before she goes to bed so that blue light from her device doesn’t interrupt/inhibit the release of melatonin. [1 mark]

Eating and drinking patterns:

- She should refrain from eating and drinking anything prior to her wanting to go to sleep, especially something with caffeine, as this will cause her to become more alert.
- She should not eat at times that are not in line with her circadian rhythm or outside daylight hours as this can influence the timing of the peripheral clocks in other organs. Peripheral clocks might become out of sync with the primary circadian clock in the suprachiasmatic nucleus and this will interfere with her sleep-wake cycle.

1 mark for mentioning one of the points above.

[1 mark]

Temperature:

Nikki's body temperature, controlled by the suprachiasmatic nucleus, will begin to decrease early in the evening. Nikki will feel ready for sleep when her core body temperature is at its greatest rate of decline. Therefore, Nikki should try and make herself warm by sitting with a blanket on the couch or having a hot shower. This will increase the blood flow to her skin and when the skin is warm, heat will be lost from her body and her temperature will drop.

[1 mark]

Daylight:

Nikki should ensure that daylight can enter her room when it is morning time. Daylight is the primary zeitgeber that will help her to regulate her circadian rhythm.

[1 mark]

- d. *Definition of long-term depression (LTD)* long term depression is the long-lasting, repeated or prolonged decrease in the strength of neural pathways. LTD could also be described in terms of repeated low-level stimulation or prolonged suboptimal activation of neural pathways.

[1 mark]

Application of long-term depression (LTD): There would be a weakening of the neural connections in Nikki's brain involved with the old computer system due to infrequent use.

[1 mark]

Reference to the new computer system/ Long term potentiation (LTP) neural pathways that represent how to use the new computer system would modify and strengthen due to repeated activation as Nikki continues to practise how to use the new equipment.

[1 mark]

Question 8 (6 marks)

- a. *Definition of multidimensional:* The social and emotional wellbeing (SEWB) framework acknowledges that there are many parts, components, elements that contribute to social and emotional wellbeing.

[1 mark]

Example of an aspect of the framework that is multidimensional:

- The SEWB framework consists of many components/seven domains which include connection to: body, mind and emotions, family and kinship, community, culture, Country, spirituality and ancestors.
- The SEWB framework explores how historical, social, political, and cultural determinants impact on the expression of each domain.

1 mark for mentioning one of the points above.

[1 mark]

Definition of holistic: When looking at social and emotional wellbeing through a holistic perspective it acknowledges that the person should be considered as a whole. This includes many integrated elements rather than viewing wellbeing through separate and isolated components.

[1 mark]

Example of an aspect of the framework that is holistic:

- The framework acknowledges the whole person and references many factors that contribute to the wellbeing of the person. Including their connection with: body, mind and emotions, family and kinship, community, culture, Country, spirituality and ancestors.

- The domains and determinants are interconnected and are not considered in isolation.

(other appropriate responses are acceptable).

1 mark for mentioning one of the points above.

[1 mark]

- b. *Definition of cultural continuity:* Cultural continuity is the process that enables for cultural knowledge, practices and values to be passed on to other generations.

[1 mark]

Explanation of how cultural continuity can enhance social and emotional wellbeing:

- Cultural continuity helps Aboriginal and Torres Strait Islander peoples to develop a strong identity, awareness of the history of their peoples and knowledge about who they are as a community.

- Cultural continuity is a protective factor against mental health issues.

- Cultural continuity promotes resilience and healing of past trauma.

(other appropriate explanations are acceptable).

1 mark for mentioning one of the points above.

[1 mark]

Question 9 (7 marks)

- a. *Identification of the biological process:* Spinal reflex

[1 mark]

Explanation of one of the roles of a spinal reflex:

- The spinal reflex can help Felicity avoid danger/pain.

- The spinal reflex is a survival mechanism/ has an evolutionary function to protect Felicity.

1 mark for mentioning one of the points above.

[1 mark]

Note: Students are unable to receive the second mark if they don't refer to Felicity.

- b. *Description of the sensory response:* sensory information was received by Felicity's sensory neurons in the peripheral nervous system when she stepped on the glass. The information then travelled to the spinal cord.

[1 mark]

Roles of the spinal cord: The spinal cord received the information, interpreted it as harmful and initiated the reflex/arc

[1 mark]

Description of the motor response: The message then returned to the peripheral nervous system and motor neurons transmitted the message to the muscles in her leg which enabled her to quickly jump away.

[1 mark]

Note: 0 marks if you said that the information travelled to the brain, this response is initiated by the spinal cord. Also, a maximum of 2 marks can be awarded if the scenario was not referenced.

- c. *Identification of where the response occurs:* The response is initiated by the spinal cord. [1 mark]

Acknowledgement that the response is an unconscious response: Felicity moved away from the glass before her brain had received the information, so she had no conscious awareness of what happened. [1 mark]

Question 10 (4 marks)

- a. *Identification of the correct stage:* Hayden was demonstrating the freeze response [1 mark]

Outline one of the following ways in which the freeze response is helpful.

- Hayden thought he was in danger and needed to initiate a survival/ an adaptive response.
- Hayden is remaining still and silent in an attempt to avoid detection from elements in the environment that could be potentially dangerous.
- Hayden is conserving energy in an attempt to have more energy in reserve ready to use once he has understood the nature of the danger he is facing.

1 mark for mentioning one of the points above. [1 mark]

- b. *Identification of the correct stage:* Alarm Countershock [1 mark]

Hayden's ability to cope with the stressor: When the Alarm Countershock stage is first activated Hayden's ability to cope with the stressor is below the normal level of resistance however seeing he is now helping the man, his ability to cope is above normal resistance levels. [1 mark]

Note: The response must include both Alarm and Countershock in order to receive the first mark.

Question 11 (10 marks)

When marking extended responses, a 'holistic' approach should be taken. Emphasis should be given to the overall quality of the student's response.

At first you would categorise a response as being high (8-10), medium (5-7) and low (<5).

You would then make a final decision as to the quality of the response and a final score.

Responses must always link to the scenario.

The model responses provided would reflect a response that would receive 8 and above.

In order to achieve 5/10 the student must make reference to each of the following elements.

- Overview of between-subjects design and within subjects design
- Identification of relevant extraneous variables
- Description of gut-brain axis, gut microbiota and stress
- Reference/link to the scenario (faecal transplants)

Evaluation of between-subject design including extraneous variables

A between subjects design is a type of experimental design where each participant is allocated into one of two (or more) groups/conditions. Usually there are two groups/conditions where one is the control group and takes a placebo, and the other is an experimental group who takes the treatment. In the faecal matter study, it is likely that the control group took some form of placebo like a sugar pill, and the experimental group received the faecal transplant in the form of a pill. A larger group of participants is needed to ensure that the participant variables are spread across the conditions and so that there is an increased likelihood that the results can be generalised to the population.

A weakness of a between subjects design is individual participant differences since each participant only partakes in one condition. The characteristics of the participants may influence results, rather than the experimental treatment. However, if random allocation was used to allocate the participants into the two conditions, then the experimenters have mitigated individual participant differences. Experimenters can also try to match participants in each group on similar characteristics to minimise possible participant differences.

A strength of between subjects design is there are no order effects between conditions since each participant only partakes in one condition, unlike within subjects design where participants partake in both conditions.

Evaluation of within-subject design including extraneous variables

A within subjects design is a type of experimental design where each participant partakes in both the experimental and the control conditions. If the faecal matter study used a within subjects design, it would mean that the participants undertook the placebo condition and the faecal transplant during the study. A small group of participants can be used since participants undertake both conditions.

A weakness of a within subjects design is order effects where the participant has gained experience participating in the first condition, and may use the knowledge or practice that they gained in the first condition, to (often unintentionally) alter the results in the second condition. However, counterbalancing can be used to counter order effects. Counterbalancing is when half the participants complete condition A first and condition B second, and the other half of participants completed condition B first and condition A second.

A strength of within subjects design is there are no participant differences because participants in both conditions are identical.

Gut-brain axis

The gut-brain axis (GBA) is a bidirectional communication pathway which connects the central nervous system and the enteric nervous system. Feeling stressed or anxious can cause disruption in the gut and result in symptoms such as having an upset stomach or having a disruption to the gut such as antibiotics (which reduce the diversity of the gut microbiota) can result in psychological symptoms such as increased mood swings, emotional arousal, reduce motivation.

Gut microbiota

Gut microbiota are all of the microorganisms that are in an individual's gastrointestinal tract. The gut microbiota can be affected by both internal and external factors including diet and disease. The greater the diversity of the gut microbiota, the more resistant we can be to stress. Research into faecal transplants is primarily focused on transplanting the diverse bacteria from one person, into the gut of another person to improve their gut microbiome and subsequently their mental health. Researchers have demonstrated the opposite in rats, that transplanting faecal matter from a person with depression into a rat caused the rat to display depression-like symptoms.

Stress

Stress can include both psychological and physiological responses to a stressor. Stress affects people in different ways, including physiological changes such as heart rate increasing and sweating, and psychological changes which include both emotional and cognitive components. A cognitive effect could be distorted perceptions or inability to problem-solve effectively, and an emotional effect could be reduced capacity to manage emotions and feeling irritable. Overtime, the emotional changes in particular can lead to mental disorders such as depression.

Acute stress lasts for a relatively short amount of time whereas chronic stress lasts for a prolonged period of time. Chronic stress often has health impacts both physiologically and psychologically. Chronic stress can decrease the diversity of gut microbiota which can lead to poorer psychological functioning and mental health.

END OF SUGGESTED RESPONSES