

BLOA Learning outcomes

General learning outcomes

Outline principles that define the biological level of analysis. (8)

Explain how principles that define the biological level of analysis may be demonstrated in research (that is, theories and/or studies). (8)

Outline (8) - Give a brief account or summary.

Explain (8) - Detailed account including reasons or causes.

1. Behaviour can be innate because it is genetically based.

Evolution theory

- Evolution - the passing of genes by those who best adapts to their environment.
 - Survival of the fittest.
 - Natural selection - the process where organism best adapts to their environment survive and produces offspring.
 - The selection of traits which are beneficial to survival and reproduction.
- Suggests that behaviour develops over time genetically due to natural selection.
- Selfish gene - we are all inherently “selfish” because we have an innate need to increase the chance that our genes be propagated.

Money - Sex Change Case Study (Genetics)	
[A]	Prove that nurture determined gender identity, not nature.
[P]	<ul style="list-style-type: none"> - Longitudinal study on David Reimer. - David Reimer was a boy who lost his penis while a circumcision accident. - Money suggested David's parents to give him a sex change. <ul style="list-style-type: none"> - He did not reveal his true motive was to prove that nurture determines gender identity, not nature.
[F]	<ul style="list-style-type: none"> - When David grew up, he displayed masculine behaviour. - Causing problems in school with his peers.
[C]	<ul style="list-style-type: none"> - Proves the psychosexual development is determined by chromosomes and hormones.
[E]	<ul style="list-style-type: none"> - Ethical guidelines: Unethical <ul style="list-style-type: none"> - A lot of deception and uninformed consent. - No protection from physical and mental harm. - No rights of withdrawal. - Milton Diamond was not convinced, he examined the role of hormones on the developing fetus. <ul style="list-style-type: none"> - Suggesting that psychosexual development is not determined by genitalia or upbringing, but rather chromosomes and hormones.

2. Animal research can provide insight into human behaviour.

- Animal research are sometimes the only feasible method of executing a research study.
- Animal research can be generalised to humans, to some extent, because we are similar.

Seligman - Learned Helplessness Dog Study (Depression)	
[A]	Prove that Learned Helplessness can lead to depression.
[P]	<ul style="list-style-type: none"> - A dog was trapped in an enclosed area where the floor was lined with electrodes. - The experimenter would activate the electrode once in a while. - The dog would jump over a low wall to the other side of the enclosed area where no electrodes were on the floor. - The experimenter raised the wall slowly until it was too high for the dog to jump over. - Then after a few trials, the experimenter lowered the wall again.
[F]	<ul style="list-style-type: none"> - The dog gave the high wall a few attempts. - But after knowing that it is impossible to jump across, the dog gave up and let itself get electrocuted. - When the walls were lowered again, the dog did not attempt to jump across.
[C]	<ul style="list-style-type: none"> - The dog learnt that he is incapable of jumping across. - Learn that its are helpless therefore lowering its self esteem.
[E]	<ul style="list-style-type: none"> - Low in ecological validity, lab experiment. - Controlled, no confounding variable. - Animal experiment can provide insight into human behaviour. - Unethical, participants did not have rights to withdraw. - Induced fear and depression into participants.

3. There is a biological correlation to behaviour

Kasamatsu & Hirai - Monk Serotonin Study (Serotonin)	
[A]	Investigate how sensory deprivation affects the brain.
[P]	<ul style="list-style-type: none"> - Studied a group of Monks on a 72 hour pilgrimage to a mountain. - The Monks were not allowed to speak, eat or drink. - They were exposed to cold late autumn weather. - After 48 hours, the Monks started seeing hallucinations of ancestors and feeling their presence.
[F]	<ul style="list-style-type: none"> - Researchers took blood samples before and after their pilgrimage. - The found increased level of serotonin in the Monks' brain. <ul style="list-style-type: none"> - Especially in the Hypothalamus and Frontal Cortex. - Resulting in hallucination.
[C]	<ul style="list-style-type: none"> - Sensory deprivation triggered the release of Serotonin. <ul style="list-style-type: none"> - Serotonin - responsible for Sleep, Arousal level, and Emotions.

Discuss how and why particular research methods are used at the biological level of analysis (for example, experiments, observations, correlational studies). (22)

Discuss (22) - A considered and balanced review, including a range of arguments, factors or hypothesis. Opinions and conclusions presented clearly supported by appropriate evidence.

Research methods

Research method: Experiments

How are experiments used?

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Sperry - Hemisphere disconnection and unity in conscious awareness	
[A]	Investigate behavioural, psychological and neurological consequences when the left and right hemisphere of the brain is disconnected.
[P]	<ul style="list-style-type: none"> - Subjects were patients who had disconnection surgery to stop epileptic seizure. <ul style="list-style-type: none"> - Each hemisphere controls the opposite side of the body. - They were given a series of tests. - Test one <ul style="list-style-type: none"> - Visual information is presented to the left or right side for 1/10th of a second - Eyes will not have time to readjust hence stimulus on the right will be received by the left hemisphere, vice versa. - Test two <ul style="list-style-type: none"> - Present tactile (touch) stimulus to the left or right side - Screen is used to cover and remove visual identification - Stimulus felt on the left side will be received on the right hemisphere, vice versa.
[F]	<ul style="list-style-type: none"> - Object shown on the left side will only be recognized when its shown on the left side again, vice versa. - Only objects shown to the right visual field can be named verbally or written down. - Objects shown to the left visual field cannot be named. - Subjects were shown a Dollar Sign on the left and a Question Mark on the right. <ul style="list-style-type: none"> - They were asked to draw what they see with their left hand (they cannot see their left hand), subjects drew a Dollar Sign. - When asked what they had just drawn, they would tell the experimenter "A Question Mark". - If an object was felt by the left hand, it can only be recognized by the left hand again.
[C]	<ul style="list-style-type: none"> - Brain function is localised. - Speech and writing comprehension happens in the left hemisphere. - Processing of image and visuals happen in the right hemisphere. - There is a different visual perception and memory storage in each hemisphere.
[E]	<ul style="list-style-type: none"> - Made use of patients who underwent hemisphere disconnection surgery as a cure for epileptic seizure, bypassed ethical guidelines of needing to physically harm the subject (even with consent). - Natural experiment, high in ecological validity.

Why are experiments used?

Strengths of Experiments

- Can be repeated, results tend to be more reliable
- Controlled environment, removes confounding variable
- Isolation of IV and DV give a clear cause and effect relationship
- Can always be generalised to a certain extent
- Data easily measured

Weaknesses of Experiments

- Lab environment, low in ecological validity
- May break ethical guidelines
- Lower generalising potential
- [Natural experiment] No control over variables, unpredictable
- Possibility of Demand characteristics

Research method: Case studies

How are case studies used?

<u>The case study of Clive Wearing (Brain damage)</u>	
Description	<ul style="list-style-type: none"> - Suffered damage in Hippocampus due to a contraction of a virus. - His disease left him with extensive brain damage (parts of his temporal lobes). - Suffers from Retrograde and Anterograde amnesia. - MRI scanning show damage to the hippocampus and some of frontal regions. - Episodic memory and some of his semantic memory are lost. - He can still play piano, conduct music and remember his wife - He still has his implicit memory including his emotional memory for his wife.
[E]	<ul style="list-style-type: none"> - Ecological validity: High, study of a real life case. - Low potential ability to generalise because cases are individual. - Ethics: Patient's name was disclosed under consent.

Milner and Scoville- The Case Study of HM	
Description	<ul style="list-style-type: none"> - HM suffered from epilepsy. - Went through lesioning to remove temporal lobe. - Surgeon accidentally removed parts of the Hippocampus (responsible for LTM retrieval). - Caused anterograde and retrograde amnesia. <ul style="list-style-type: none"> - Retrograde amnesia only affected memory up to 11 years before surgery. - He can remember things 12 years before the accident. - Discovered that the cortex and hippocampus is connected and years in first grade would not be fully consolidated until first year in sophomore. - Emotional memory was intact, at the mention of the death of his favourite uncle, he experienced distress.
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Why are case studies used?

Strengths of Case studies

- Unique studies that would otherwise be unethical to do
- Less likelihood to break ethical guidelines
- Insight into certain areas of psychology that would otherwise be difficult to study

Weaknesses of Case studies

- Low potential to generalise
- Since it cannot be repeated, results might be unreliable

Discuss ethical considerations related to research studies at the biological level of analysis. (22)

Discuss (22) - A considered and balanced review, including a range of arguments, factors or hypothesis. Opinions and conclusions presented clearly supported by appropriate evidence.

Ethical guidelines

- Informed consent
- Right to withdraw
- Deception
- Debriefing
- Confidentiality/Privacy
- Protection of participants (from mental and/or physical harm)

The need to break guidelines

- For research purposes, where there are no other feasible methods
 - Regarding specially towards animal research, where most ethical guidelines are broken.

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Physiology and behaviour

Explain one study related to localization of function in the brain (for example, Wernicke, Broca, Gazzaniga and Sperry). (8)

Explain (8) - Detailed account including reasons or causes.

<u>Sperry - Hemisphere disconnection and unity in conscious awareness</u>	
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Using one or more examples, explain effects of neurotransmission on human behaviour (for example, the effect of noradrenaline on depression). (8)

Explain (8) - Detailed account including reasons or causes.

Neurotransmitter

- Chemical messenger that allows communication between nerve cells.
- Receptor sites that can only take in specific electrochemical.
- Travels from the Pre-Synaptic neuron through the Synapses to the Post-Synaptic neuron.

Serotonin

- Produced in Pineal Gland.
- Responsible for
 - Emotion
 - Sleep
 - Mental wellbeing (Happiness)/Depression
- During the process of neurotransmission, not all Serotonin gets absorbed by the Post-Synaptic neuron.
- The extra Serotonin is taken back into the Pre-Synaptic neuron through Active Reuptake; or
- The Serotonin gets broken down by Monoamine Oxidase (MAO), which causes a low level of Serotonin being absorbed by the Post-Synaptic neuron.
- Low level of serotonin in the Post-Synaptic neuron means impulse cannot be started.

<u>Kasamatsu & Hirai - Monk Serotonin Study (Serotonin)</u>	
[A]	Investigate how sensory deprivation affects the brain.
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Dopamine

- Responsible for
 - Movements (balances)
 - Emotional responses
 - Pleasure and pain
 - Regulating logical thought processes (in frontal lobe)
- Vital in controlling balancing and the coordination of body movements.
- Low levels of Dopamine can cause lack of control over body movements.
 - e.g. Parkinson's
- High levels of Dopamine causes the inability to rationalise information and depreciation of logical processes.
 - e.g. Schizophrenia

Hietala - Presynaptic dopamine function study (Dopamine)	
Description	<ul style="list-style-type: none">- Measured by uptake of flurodopa (radioactive compound) was observed by a PET scan for 7 schizophrenic patients and 8 healthy people (controls).- The fluorodopa influx constant increased in schizophrenic patients.- Alterations in presynaptic dopamine function make people more inclined to have schizophrenia.

Using one or more examples, explain functions of two hormones in human behaviour. (8)

Explain (8) - Detailed account including reasons or causes.

Hormones

- Chemical messengers that transfers information to cells to coordinate functions of different part of the body.

Testosterone

- Produced in male Testes Gland and female Ovary Gland.
- 10 times more Testosterone produced in adult male than female.
- Development and emotion in puberty.
- Voice deepening, sperm and muscle development.
- Increase in aggression, dominance and sexual behaviour.

<u>Dabbs et al - Testosterone and Aggression Correlation study</u>	
Description	<ul style="list-style-type: none"> - Measure the level of Testosterone in 692 male adult prisoners. - Prisoners who committed sex and violence crime had higher level of Testosterone. <ul style="list-style-type: none"> - When compared to those who were in jail for property crime or drug abuse.

Melatonin

- Produced in the Pineal Gland.
- Regulates sleep-wake cycle, pubertal development and seasonal adaption.
- More Melatonin is released when there is no sun, causing drowsiness making the person sleepy.
- Light received by the optical nerve in the eye causes a signal to be sent to the Suprachiasmatic (Supra-chias-matic) Nucleus (SCN).
- SCN sends information to parts of the body including the Pineal Gland
- SCN modulates the levels of hormones in the body

<u>Rosenthal - Melatonin study</u>	
Description	<ul style="list-style-type: none"> - In countries where there are low levels of sunlight, people have higher level of Melatonin - This causes Seasonal Affective Disorder (SAD), symptoms include depression.

Discuss two effects of the environment on physiological processes (Stress on immune system + Jet lag on bodily rhythm) (22)*

Discuss (22) - A considered and balanced review, including a range of arguments, factors or hypothesis. Opinions and conclusions presented clearly supported by appropriate evidence.

*A little note on this, I would personally advise you to avoid this question at all costs if it comes up as a 22 mark. That is because the Waterhouse et al. study needed for explaining the effects of Jet Lag is ridiculously complicated and it comes to a stupidly simple and pointless conclusion.

Stress on Immune System

- Experienced through "stressor stimuli" e.g. work overload.
- Cognitive appraisal evaluates the person as being unable to cope with the stressor, a mismatch.
- Stress can either give Physiological or Psychological responses, or both.
 - Physiological responses e.g. Insomnia
 - Psychological responses are reflected through behaviour
- Release of stress hormones - Cortisol and Adrenalin.
 - From Adrenal Gland
 - Increases heart rate
 - Constricts blood vessels
 - Dilates air passages to allow more oxygenated blood to flow around the body and to the Brain.
 - Increase in Brain activity means higher level of productivity and efficiency
- If Cortisol and Adrenalin levels are kept at a constant high, it can result in a lethal outcome.
 - Can cause insomnia
 - High blood pressure
 - Deteriorating immune system
 - Overtime, causing coronary heart disease and cancer

Work-related stress

- Classed under Chronic and Prolonged stress.
- Under a constant secretion of Cortisol and Adrenalin.
- Work overload
 - Too much work over a short period of time; or
 - Highly demanding job.
- Work underload
 - Too little to do over a long period of time; or
 - Under demanding job.

Kiecolt-Galser et al - Stress in exam study (Work-related stress)	
[A]	Investigate the stress from examinations and its effect on the immune system.
[P]	<ul style="list-style-type: none"> - Participants were 75 first year medical students (49 males, 26 females). - Blood samples were taken before and during their exams. - Immune functioning was assessed by measuring the T-cell activity in the blood sample. - Students were given survey for self assessment on psychiatric symptoms.
[F]	<ul style="list-style-type: none"> - Samples taken before exam had more T-cells. - Students that claimed that they felt lonely in the survey had a more vulnerable immune system.
[C]	- Stress decreases the functionality of our immune system.
[E]	<ul style="list-style-type: none"> - Confounding variable: No control over other factors that might have affected the immune system e.g. Caffeine, drugs, diet, sleep etc. - Correlational study: cannot identify cause and effect relationship. <ul style="list-style-type: none"> - Did stress cause sickness? Or did sickness cause stress? - Only students were used in the sample.

Jet lag on Bodily Rhythm

- Melatonin (hormone) - secretion of Melatonin controls the Circadian Rhythm.
- More Melatonin is released when there is no sun, causing drowsiness making the person sleepy.
 - Light received by the optical nerve in the eye causes a signal to be sent to the Suprachiasmatic (Supra-chias-matic) Nucleus (SCN).
 - SCN sends information to parts of the body including the Pineal Gland.
 - SCN modulates the levels of hormones in the body.
- Mismatch of Circadian rhythm = Jet lag.
- Circadian rhythm - regulates sleep wake cycle.
- Happens when crossing multiple timezones.

Block and Davidson - Jet lag on mice	
[A]	To examine if there is a link between the daily cycle and the death of rats.
[P]	<ul style="list-style-type: none"> - 39 male mice, 9 young, 30 old. - Mice were divided in three groups. <ul style="list-style-type: none"> - Normal cycle (Control) - West bound traveling (12 hours of light delayed for 6 hours once a week) - East bound traveling (12 hours of light advanced by 6 hours once a week) - Experiment lasted 8 weeks.

[F]	<ul style="list-style-type: none"> - 17% of the control group died (natural cause). - 32% of west bound died. - 53% of east bound died. - Experiment was repeated <ul style="list-style-type: none"> - This time, experimenters delayed the light once every four days. - The mice died more easily, especially the "eastbound" mice. - Anxiety level remained the same throughout the entire experiment (measured a stress hormone).
[C]	<ul style="list-style-type: none"> - The rats did not die of stress, died because of the constant changes in body rhythm.
[E]	<ul style="list-style-type: none"> - Link to principle - Animal research can provide insight into human behaviour. - Method was scientific <ul style="list-style-type: none"> - Measured the level of stress hormone to determine the cause of death. - Despite that, it just disproved one cause of death, there can be other causes although unlikely. - Assumption made on concluding, that death is cause by changes in body rhythm.

And here comes the killer - Waterhouse et al....

Waterhouse et al. - Jet lag study	
[A]	Identify some determinants of jet lag and its symptoms.
[P]	<ul style="list-style-type: none"> - 85 subjects were used, 54 male, 31 female. - Athletes, coaches, academics from UK attending a conference in Australia. - A widespread of <ul style="list-style-type: none"> - Age - Sleep habits - Fitness - Time arrival in Australia - Previous travels to Australia - 24 hours flight - UK -> Singapore (one hour stopover) -> Australia. - Participants were studied during the flight and for the first 6 days in Australia. <p>During Flight</p> <ul style="list-style-type: none"> - <u>Group 1</u> (1/3 of the subjects) <ul style="list-style-type: none"> - Left UK at local evening time, arrived Australia at 06:00. - 32 subjects recorded the amount of time they spent asleep on both flights. - <u>Group 2</u> (2/3 of the subjects) <ul style="list-style-type: none"> - Left UK in the morning, arrived Australia in the late afternoon. - 25 subjects recorded the amount of time they spent asleep on both flights. <ul style="list-style-type: none"> - Fitness was determined from a questionnaire, and took into account the age of the subject. - Subjects were awarded a score between 1 to 5 (5 being fittest). - Chronotype was determined by questionnaire. - 7 were morning type, 1 was evening type, the rest were intermediate. <p>In Australia</p> <ul style="list-style-type: none"> - Subjects were asked to fill in a questionnaire about jet lag, using a visual analogue scale. <ul style="list-style-type: none"> - The amount of jet lag - The amount of fatigue - Time they got to sleep - Ease of sleeping and staying asleep - Time they woke up - Alertness 30 minutes after waking - Subjects were shown the questionnaire before the journey, so they know what to be aware of.
[F]	<ul style="list-style-type: none"> - Results made in Australia showed that symptoms of jet lag decreased over time. - Men showed a slight tendency to sleep later and record less fatigue. <ul style="list-style-type: none"> - May be due to a masculine stereotype (self fulfilling prophecy). - Old subjects showed less jet lag and fatigue. <ul style="list-style-type: none"> - Contradicts with Block & Davidson's Study.
[C]	- Conclude that different factors can affect jet lag.

[E]	<ul style="list-style-type: none">- Methodology was not scientific enough, only measured based on self evaluation surveys.- Possible confounding variable: Male participants showed less fatigue because of masculine stereotypes.- Analogue visual scale was used which meant the scale did not categorize the response.
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LO conclusion

- External stressors i.e. Work Stress and Jet Lag can affect our health.
- A lot of variables can affect how severe Stressors affect our health.
- Exposed to Stressors for a prolonged period can lead to sever health problems e.g. insomnia, weak immune system.

Examine one interaction between cognition and physiology in terms of behaviour (for example, agnosia, anosognosia, prosopagnosia, amnesia). Evaluate two relevant studies. (22)

Examine (22) - Consider an argument or concept in a way that uncovers the assumptions and interrelationships of the issue.

Evaluate (22) - An appraisal by weighing up the strengths and limitations.

Cognition: **Memory**

Physiology in terms of behaviour: **Amnesia due to brain damage**

Interactions: **Retrieval and encoding of memory**

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[E]	<ul style="list-style-type: none"> - Ecological validity: High, study of a real life case. - Low potential ability to generalise because cases are individual. - Ethics: Patient's name was disclosed under consent.

Discuss the use of brain imaging technologies (for example, CAT, PET, fMRI) in investigating the relationship between biological factors and behaviour. (22)

Discuss (22) - A considered and balanced review, including a range of arguments, factors or hypothesis. Opinions and conclusions presented clearly supported by appropriate evidence.

Relationship: **Abnormal protein fragments in the brain (Alzheimer disease) causing Amnesia.**

Alzheimer disease

- Abnormal protein fragments kill brain cells
 - Amyloid plaques
 - Neurofibrillary tangles
- Begin at the Hippocampus, destroying brain cells and connections
 - Making it harder for the retrieval and creation of memory (memory store and creation)
- Damages Medial Temporal Lobe where Explicit Memories are heavily involved in.
- Explicit memory
 - Episodic (Affected)
 - Semantic (Affected)
- Causing difficulty to speak, understand, recall and regulate motor processes (e.g. heart beat, breathing, eventually causing death).

PET scan - Positron Emission Tomography scan

- Requires the injection of radioactive substance.
 - Of which emits gamma ray received by the scanner.
- Monitors glucose and metabolism.
- Produces colour map of the brain activity.

<u>Mosconi - Alzheimer longitudinal study</u>	
[A]	To find the earliest signs of Alzheimer's disease in the brain.
[P]	<ul style="list-style-type: none"> - Kept track of 53 normal subjects for over 9 to 24 years - Scanned them using a PET scanner (measures metabolic rate)
[F]	- Those who had reduced metabolic rate in the Hippocampus developed into Alzheimer disease.
[C]	<ul style="list-style-type: none"> - Shows that technology can pick up initial signs of brain deterioration. - Using technology can provide accurate results.
[E]	<ul style="list-style-type: none"> - Ethical consideration: Causes physical harm in subjects <ul style="list-style-type: none"> - Injection of radioactive substance is bad for the body

Relationship: Volume of Hippocampus in relation to Spacial Memory.

MRI - Magnetic Resonance Imaging

- Technology that measures brain activity by detecting associated changes in concentration of oxygen in the blood.
- Deoxygenated haemoglobin is more magnetic than Oxygenated haemoglobin.
- Requires the patient to be still in a small area for a long time.
 - May spark claustrophobia
- People with metal parts on their body cannot use a MRI machine because MRI has a strong magnetic field.

<u>Maguire et al. - Taxi driver study</u>	
[A]	Investigate the function of Hippocampus in spacial memory.
[P]	<ul style="list-style-type: none"> - Participants were 16 mentally and physically healthy right handed male taxi drivers. <ul style="list-style-type: none"> - Age range from 32 to 62. - Controls were 50 mentally and physically healthy right handed male. <ul style="list-style-type: none"> - Age range and distribution was similar to the taxi drivers. - Participants and controls were scanned with the same MRI machine. - The amount and density of the grey matter in the hippocampus (which translates into the processors) was counted.
[F]	<ul style="list-style-type: none"> - Taxi drivers have a significantly larger hippocampus. - The volume of the hippocampus correlates with the amount of time as a taxi driver.
[C]	- MRI can be used to detect the active areas of the brain.
[E]	- Observing the concentration of deoxygenated haemoglobin is an accurate measure for brain activity.

Relationship: Brain Damage causing Amnesia.

<u>The case study of Clive Wearing (Brain damage)</u>	
Description	<ul style="list-style-type: none"> - Suffered damage in Hippocampus due to a contraction of a virus. - His disease left him with extensive brain damage (parts of his temporal lobes). - Suffers from Retrograde and Anterograde amnesia. - MRI scanning show damage to the hippocampus and some of frontal regions. - Episodic memory and some of his semantic memory are lost. - He can still play piano, conduct music and remember his wife - He still has his implicit memory including his emotional memory for his wife.
[E]	<ul style="list-style-type: none"> - Ecological validity: High, study of a real life case. - Low potential ability to generalise because cases are individual. - Ethics: Patient's name was disclosed under consent.

Genetics and behaviour

With reference to relevant research studies, to what extent does genetic inheritance influence behaviour? (22)

To What Extent (22) - Consider the merits or otherwise of an argument or concept. Opinions and conclusions should be presented clearly and supported with appropriate evidence and sound argument.

Genetics on behaviour

- Monozygotic twins -> identical twins.
 - 100% same genes.
 - If twin A has something, twin B must have it.
- Dizygotic twin -> fraternal twins/siblings.
 - 50% similar genes.
- If there is a genetic aspect to behaviour, a high concordance rate would be expected from Monozygotic twins.
- Different types of genetic studies
 - Twin studies
 - Family studies
 - Adoption studies

Correlational study

- Genetics research mostly done through correlation study.
- Concordance rate (presence of the same trait).
- Relationship/Association.
- Show to what extent two variables are related.

Strengths of correlation studies

- Shows how closely two variables relate
- High ecological validity, natural environments
- Allow study that could not be tested through experiment ethically
- Representative sample

Weaknesses of correlation studies

- Bidirectional ambiguity: cannot tell which caused which
- No manipulation of independent variable

Procedures of correlational genetic studies

- Correlational genetic studies are all done in a similar manner.
- Observation of pairs of twins or families.
- For twin studies, both Monozygotic (MZ) and Dizygotic (DZ) twins, both reared together and apart, will be used.
- Compare concordance rate of depression through the means of percentage.

Twin studies

- If it were a wholly genetic disorder the concordance rate for MZ twins should be 100 per cent and for DZ twins 50 per cent.
- Otherwise, other factors must be involved.

Family studies

- Similarly to twin studies, if depression was caused by genetic factors, we would expect it to run in families.
- The closer you are genetically to someone in your family, the more likely you will be to have depression.

Genetics studies grid					
Researcher	Research for	# of pairs	Subjects		Concordance rate
Price	Bipolar depression	97	MZ twins	Reared together	68%
				Reared apart	67%
		119	DZ twins		23%
Allen	Unipolar depression	-	MZ twins		40%
		-	DZ twins		11%
Bertelsen, Harvald and Hauge	Unipolar depression	-	MZ twins		80%
		-	DZ twins		16%
McGuffin et al.	Unipolar depression	117	MZ twins		40%
			DZ twins		20%
Gershon	Unipolar depression	-	First degree relative		<ul style="list-style-type: none"> - Individuals with a first degree relative with depression was about two to three times higher than in the general population. - Social learning theory might be a possible explanation.
Wender	Unipolar depression	-	Adopted children		Adopted children who went on to develop depression had biological parents that were eight times more likely to have depression than their adoptive parents.

Discuss ethical considerations in research into genetic influences on behaviour.

(22)

Discuss (22) - A considered and balanced review, including a range of arguments, factors or hypothesis. Opinions and conclusions presented clearly supported by appropriate evidence.

Main ethical considerations

- Confidentiality
 - Since these studies are about the intelligence and abnormal behaviour, they should be kept confidential.
 - Information can affect the participant's future.
 - If identity is exposed, it can cause labeling effect.

Issues stemming from ethical considerations

- Who and why does anyone have the right to know?
- Stress due to having the knowledge that they have a gene making them more prone to a certain sickness or cancer.
- Which third parties should have access, right to control information? How will the third parties respond? Insurance companies, adoption agencies, educational systems.
- Labeling and consequential issues/problems.
 - Discrimination, in extreme cases can lead to racism and genocide.
 - Dehumanisation, the removal of certain human rights.
 - Stereotyping, spotlight anxiety affecting performance.
- Predetermined life of the subject.
 - Determining one's ability and future based on their genes.
 - Eugenics - The belief that human characteristics are due to genetics and that society should attempt to scientifically breed a race of superior people.
 - **(NEVER, I STRESS, NEVER USE THIS FOLLOWING EXAMPLE IN YOUR RESPONSE** but the film *Gattaca* is a good portrayal of what Eugenics can lead to in human society.)
- The Nature vs. Nurture debate.

What is intelligence?

- 'The capacity for understanding' and 'the ability to perceive and comprehend meaning'.
- Intelligence tests were first devised by Binet in 1905 and results are called Intelligence Quotient (IQ), still used today.
- The aim was to identify children who were not achieving as much as other of same age, so they can be helped.
- Assumes intelligence is not a fixed quantity but it can change.

Gould - Meta-analysis of the IQ study of Yerkes (1915)	
[A]	Give a critical account of Yerkes' IQ testing and its effect.
[P]	<ul style="list-style-type: none"> - Yerkes was allowed to administer an IQ test to 1.75 million army recruits at the start of World War I. - The army recruits were split into two groups: Army Alpha and Army Beta. - Army Alpha (for those who can read and write) were tested in writing. - Army Beta (for those who cannot read nor write - tested on pictorial test) and if they failed the the Army Beta test they would be asked to do an individual spoken. - Average mental age of white American males was 13 years old. This is just above the level of 'moronity' - European immigrants could be graded by their country origin. <ul style="list-style-type: none"> - The average mental age of men of many nations was a moron. - Darker people of southern Europe and the Eastern Slavs were less intelligent than fair people of western and northern Europe. - Black people had the lowest mental age at just 10.41 years old.
[F]	<ul style="list-style-type: none"> - Impact on immigration, causing political debates. - 1924 Immigration Restriction Act reset immigration quotas, southern and eastern Europeans were effectively barred. - Estimated that 6 million people from these areas were denied access to US over the next 20 years.
[C]	<ul style="list-style-type: none"> - Tests claimed to measure native intellectual ability (intelligence unaffected by environment or experience). <ul style="list-style-type: none"> - Beta tests still required culturally related knowledge and alphanumeric knowledge. - Requirements for taking the Alpha test were different in different camps. - Results should not be generalised to the nation because of the sampling of subjects and other factors affecting the procedure. - Shows how belief can triumph over reason. - Raises the question of "Who determines the questions on the IQ tests?"
[E]	<ul style="list-style-type: none"> - Provides alternate perspective in viewing IQ tests. - Highlights problems in the collection and interpretation of data. - Convincingly argues the tests were neither reliable nor valid since many were given the wrong tests. - Was not a test for native intellectual ability but cultural knowledge, which could not have been acquired by people who have recently arrived in country. - Highlights dangers of ethnocentrism, contribute to scientific racism. - Shows importance of considering original research rather than accepting brief summaries as well as importance of being critical, looking or details of research and how it was conducted.

Examine one evolutionary explanation of behaviour. (22)

Examine (22) - Consider an argument or concept in a way that uncovers the assumptions and interrelationships of the issue.

For most cases, you are likely to be doing the Evolutionary Theory of Disgust for this LO because it is (or was, at least) in the Course Companion. Alternatively, you can choose to do other evolutionary explanation of behaviour.

Below are notes for The Evolutionary Theory of Attachment (Theorist: John Bowlby). A clear and detailed guide on this theory can be downloaded as a PDF as well on the page of the LO, with the studies included (in a different format, my apologies).

Bowlby - 44 Thieves Study	
[A]	To investigate the effects of maternal deprivation on people to see whether delinquents have suffered deprivation.
[P]	<ul style="list-style-type: none"> - Interview 44 adolescents who were referred to a child protection program in London because of stealing. - Another group of 44 adolescents were selected as controls. These people were referred to the child protection program because of emotional problems, but have not committed crimes. - Bowlby also interviewed both groups' parents to state whether their children had experienced separation during the critical period and for how long.
[F]	<ul style="list-style-type: none"> - More than half of the juvenile thieves had been separated from their mothers for longer than 6 months during their first 5 years <ul style="list-style-type: none"> - In the control group only two had had such a separation - Several of the young thieves (32%) showed affectionless psychopathy (they were not able to care about or feel affection for others) <ul style="list-style-type: none"> - None of the control group were affectionless psychopaths
[C]	<ul style="list-style-type: none"> - The reason for the anti-social behavior and emotional problems in the first group was due to maternal deprivation.
[E]	<ul style="list-style-type: none"> - Evidence comprises mainly of retrospective data. <ul style="list-style-type: none"> - Inaccuracy of memory - Experimenter bias <ul style="list-style-type: none"> - Bowlby designed and conducted this experiment himself. - Bowlby diagnosed affectionless psychopathy himself. - Only shows a correlation between maternal deprivation and affectionless psychopathy. <ul style="list-style-type: none"> - It is not a cause-effect relationship due to other variables such as diet, income, education.

<u>Lorenz - The gosling experiment</u>	
[A]	Show that attachment is innate.
[P] [F]	<ul style="list-style-type: none"> - Lorenz reared some goslings (young geese) from the moment they hatched, and found that as the goslings grew up, they would follow him about, and courted him in preference to other geese. - Lorenz also showed that goslings can also develop a social bond with inanimate objects, such as a white ball.
[C]	<ul style="list-style-type: none"> - He called this social bonding "imprinting", because he thought that the bond is somehow permanently and immediately stamped onto the nervous system from the moment of birth. - Unfortunately this is actually not true, as most researchers now believe that attachment develops through a series of stages, see <u>Schaffer and Emerson - Stages of Attachment</u>. - Lorenz showed that parental attachment is an innate behavior, and somewhat learnt as well, because repeated exposure to the stimulus is needed in order for the bond to develop.

<u>Harlow and Zimmerman - Harlow's Monkeys</u>	
[A]	A series of experiments investigating attachment in monkeys
[P] [F]	<ul style="list-style-type: none"> - 1. Infant monkeys reared in isolation. <ul style="list-style-type: none"> - Some died, others were frightened and behaved in an abnormal manner. They could not interact with other monkeys even when they were older. - 2. Infant monkeys reared with 2 surrogate mothers. <ul style="list-style-type: none"> - First surrogate mother: bare wire mothers. - Second surrogate mother: wire mothers covered in soft terry toweling cloth. - The monkeys spent more time with the cloth mother. - The infant would only go to the wire mother when hungry. Once fed it would return to the cloth mother for most of the day. - If a frightening object was placed in the cage the infant took refuge with the cloth mother. - The infant would explore more when the cloth mother was present.

[C]	<ul style="list-style-type: none">- Supports Evolutionary Theory of Attachment.<ul style="list-style-type: none">- Sensitive response and security is more important than food.- Harlow concluded that for a monkey to develop normally s/he must have some interaction with an object to which they can cling during the first months of life (critical period)<ul style="list-style-type: none">- Clinging is a natural response - in times of stress the monkey runs to the object to which it normally clings as if the clinging decreases the stress.- Bare wire cannot be clung on, as it is hollow.- Harlow found therefore that it was social deprivation rather than maternal deprivation that the young monkeys were suffering from.<ul style="list-style-type: none">- When he brought some other infant monkeys up on their own but with 20 minutes a day in a playroom with three other monkeys he found they grew up to be quite normal emotionally and socially.
[E]	<ul style="list-style-type: none">- Ethical considerations regarding animal experimentations.- Humans cannot be represented by monkeys, therefore the findings cannot be completely generalized to humans.