This is a Class 2 exam

Lebanon Evangelical School
for Boys and Girls
Loueizeh - Baabda

# Stage Exam 02

## 19DEC2022

Do NOT write in this box. Your MARK will be placed here.

| | |
|---|---|
| Subject : | A Level : Psychology 1 |
| Class : | 12A |
| Teacher : | Nour Bazzi |
| Duration : | 1 hour 30 minutes |
| Good luck! | |

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|---|---|---|
| Your name : | | *Time taken to complete exam* |
| Your Class : | | |
| Exam Room : | | |
| How many sheets, including cover sheet : | | |

- Do not open this paper until the teacher in charge instructs you to do so.
- The most important thing to remember in taking an exam is NEVER PANIC.
- If you are caught cheating in this exam, you will be awarded zero for ALL exams that are taken on this day.

SE02/20222023/PSYCHOLOGYPSY1/12A

**PART I – Multiple Choice (40%)**

1. The two hemispheres of the brain are connected by the:

a. Hypothalamus
b. Corpus Callosum
c. Hippocampus

2. Neurotransmitters are released from:

a. Postsynaptic receptors
b. Dendrites
c. Vesicles

3. Drugs that mimic a neurotransmitter's effects are called

a. Antagonists
b. Recreational
c. Agonists

4. Impulsive aggression is linked with:

a. Normal serotonin function and dopamine hypofunction
b. Serotonin hyperfunction and normal dopamine function
c. Serotonin hypofunction and dopamine hyperfunction

5. Females can behave as aggressively as males in guarding:

a. Offspring
b. Territory
c. Partner

6. According to Bushman, venting anger:

a. Reduces the aggressive drive
b. Has no effect on aggression
c. Leads to more aggression

7. In the study done by Li et al (2013), the researchers found a functional link between the PCC and:

a. Dorsal Striatum
b. Hypothalamus
c. Pre frontal Cortex

8. Our emotional responses are regulated mostly by the:

a. Occipital Lobe
b. Limbic System
c. Spinal Cord

9. What is generally the effect of serotonin in the CNS:

a. Inhibitory
b. Excitatory
c. Summatory

10. Drug research with mice has involved damaging the:

a. Mesocorticolimbic reward circuit
b. Hippocampus
c. Cerebellum

11. Amygdala dysfunction is best described as:

a. The direct cause of aggression
b. Not linked to aggression
c. Interacting with non-biological factors to cause aggression

12. Evolutionary theory is supported because there are:

a. Cultural differences in aggression
b. Gender differences in aggression
c. Lots of laboratory experiments

13. According to Freud, the unconscious mind:

a. Is like the bit of an iceberg above the waterline
b. Is relatively unimportant in influencing behavior
c. Contains thoughts and memories we are unaware of

14. The role of cortisol is emphasized by the:

a. Twin Hormone Theory
b. Cortisol-aggression theory
c. Dual-hormone hypothesis

15. In the classic study done by Raine et al (1997), the murderers and controls were matched on sex, age and:

a. Handedness and history of head injury
b. Ethnicity and schizophrenia diagnosis
c. Ethnicity and handedness

16. Different functions of the two brain hemispheres are referred to as:

a. Lamination
b. Localization
c. Lateralization

17. The key gland of the endocrine system is the:

a. Pituitary gland
b. Adrenal Gland
c. Thyroid

18. Heroin withdrawal, craving and tolerance are explained by:

a. Receptor downregulation
b. Receptor upregulation
c. Neurotransmitter reuptake

19. The somatosensory cortex is located in the:

a. Parietal Lobe
b. Frontal Lobe
c. Temporal Lobe

20. Which part of the brain is involved in self-control and inhibition of aggression?

a. Motor Cortex
b. Orbitofrontal Cortex
c. Somatosensory Cortex

**PART II – Subjective (60%)**

1. In biological psychology, you will have learned about these contemporary studies; (5pts)

   - Li et al (2013)
   - Brendgen et al (2005)
   - Van den Oever et al (2008)

a. Describe the procedure of your chosen contemporary study (2.5 pts)

b. Explain one strength and one weakness of your chosen contemporary study (2.5 pts)

2. Amanda is struggling to control her aggression, her doctor is considering sending Amanda for an FMRI scan to find out if her brain may be influencing her aggression.

a. Explain TWO reasons for Amanda's doctor sending her for an FMRI scan (pros). (2.5)

b. Name one brain scanning technique other than FMRI, and give one pro and one con for it. (2.5)

3. How is the action potential fired? Describe the process briefly. (3 pts)

4. Neurons communicate with each other through synapses: How does the synaptic transmission happen? (3 pts)

5. Cocaine: (5pts)

a. What is the nature of cocaine: Stimulant or depressant?

b. On which neurons does the cocaine have an effect? Where are they found?

c. It alters the synaptic transmission of which neurotransmitter?

d. Explain the process that happens upon cocaine intake

e. What is the long term effect of cocaine?

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d. Explain the process that happens upon heroine intake

e. What is the long term effect of heroine?

7. In terms of evaluation: talk about either the strength of cocaine research or heroine research (2 pts)

8. Explain the process of Summation (2 pts)

9. What is the role of the limbic system as a predictor of aggression? Support it by giving an example of a study. (4 pts)

10. What is the role of the prefrontal cortex as a predictor of aggression? Support it by giving an example of a study. (4 pts)

11. What role does the serotonin play in aggression? Elaborate. (4 pts)

12. What role does dopamine play in aggression? Elaborate. (4 pts)

13. Define Evolution (2 pts)

14. What is the process of natural selection? (2 pts)

15. How did evolutionary theory explain aggression? (2 pts)

16. Define catharsis and how is it used to explain aggression? (2 pts)

17. What is the dual hormone –hypothesis? Elaborate. (4 pts)

18. Explain Female aggression and then elaborate through a study done by Dabbs and Hargrove (1997) which provides evidence of testosterone effects in females. (2 pts)

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1. In biological psychology, you will have learned about these contemporary studies; (5pts)

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   - Van den Oever et al (2008)

a. Describe the procedure of your chosen contemporary study (2.5 pts)

This study compared the difference between two existing groups using a repeated measures design. The experimental group of participants consisted of 14 male heroin users recruited from a drug rehabilitation centre in the city of Xi'an, China. All were in the detoxifying stage i.e. they were withdrawing from heroin use.

They were non-cocaine using, right-handed and aged 25-47 years (mean 35 years). They had previously used heroin for 19-182 months. All were required to be heroin-free (negative urine test). None had current or past psychiatric illness, neurological disease, or head trauma.

A control group of 15 participants was also recruited who had no history of drug dependence, head injury, or psychiatric disorders. All participants smoked. The independent variable (IV) was experiment group (heroin-user) versus control participants. One dependent variable (DV) was the activity of reward-related brain areas (e.g., PCC) in a resting-state fMRI scan. Another dependent variable (DV) was a self-report measure of subjective craving.

b. Explain one strength and one weakness of your chosen contemporary study (2.5 pts)

All of the participants, including the controls, were smokers. The researchers claim they accounted for this by showing there was no significant difference between the two groups in scores on a test of nicotine dependence. However, this ignores the potential influence of an interaction between nicotine and heroin, which would have occurred in the user group but not in the control group. There is evidence that nicotine and heroin do interact biochemically. This would make it a confounding variable because it was a systematic difference between the two groups.

2. Amanda is struggling to control her aggression, her doctor is considering sending Amanda for an FMRI scan to find out if her brain may be influencing her aggression.

a. Explain TWO reasons for Amanda's doctor sending her for an FMRI scan (pros). (2.5)

fMRI shows important information about which areas of the brain are being used at any one time (same as PET) Unlike PET and CT scanning, fMRI does not use radiation so it is a very safe method of studying the brain. The images produced by fMRI are extremely clear and can show brain activity to the millimetre.

b. Name one brain scanning technique other than FMRI, and give one pro and one con for it. (2.5)

Any slide between 89 and 94

3. How is the action potential fired? Describe the process briefly. (3 pts)

When a neuron is in a resting state, the inside of the cell is negatively charged relative to the outside. When a neuron is sufficiently activated by a stimulus, the inside of the cell becomes positively charged for a split second. ⇒ The rapid switch from negative to positive charges is called depolarisation, and it creates an electrical impulse (action potential, AP) that travels down the axon towards the terminal buttons of the neuron (we usually say an AP is fired). The Action Potential (AP) is only generated once depolarisation reaches a certain threshold. It is always the same intensity, regardless of the size of the stimulus that originally generated it. If the threshold is not reached, no action potential will be fired. ⇒ As such, an action potential is an all-or-nothing event.

4. Neurons communicate with each other through synapses: How does the synaptic transmission happen? (3 pts)

When the neurotransmitter molecules cross the gap, they fit into their matching receptor, which sits on the postsynaptic neuron. There are different receptors for different neurotransmitters. The chemical signal carried by the neurotransmitters is converted back into an electrical signal in the postsynaptic neuron, which may then fire another AP. Neurotransmitter molecules that remain in the synapse are reabsorbed into the presynaptic neuron. ⇒ This process is called reuptake and makes it possible to reuse neurotransmitters.

5. Cocaine: (5pts)

a. What is the nature of cocaine: Stimulant or depressant?

Stimulant

b. On which neurons does the cocaine have an effect? Where are they found?

On the neurons of the brain's main reward system (the mesocorticolimbic pathway, which connects the subcortical emotion brain centres with frontal areas). The drug achieves its effects by altering the synaptic transmission of dopamine

c. It alters the synaptic transmission of which neurotransmitter?

dopamine

d. Explain the process that happens upon cocaine intake

Cocaine blocks the reuptake of dopamine by binding with dopamine transporter molecules on the terminal buttons of the presynaptic neuron. These molecules are responsible for recycling dopamine back into the neuron that produced it. As cocaine prevents this process, the synaptic cleft is flooded with surplus quantities of dopamine, which are all available for binding with postsynaptic receptors. => This is the main cause of the euphoric high associated with cocaine use.

e. What is the long term effect of cocaine?

After repeated cocaine use, dopamine receptors become downregulated i.e. fewer receptors are active – some are damaged and shut down – so the quantity of dopamine produced by the body

declines. => This explains withdrawal, craving for the drug, and the higher doses needed to get the same effects (tolerance)

6. Heroine: (5 pts)

a. What is the nature of heroine: Stimulant or depressant?

Depressant

b. On which neurons does the heroine have an effect? Where are they found?

neurons involved in pain, cerebral cortex, limbic system, and hypothalamus

c. It alters the synaptic transmission of which neurotransmitter?

The reason why such receptors exist for heroin/morphine is that the CNS has its own opioid system: endorphins and enkephalins are produced by the body as natural painkillers, a system that heroin readily taps into.

d. Explain the process that happens upon heroine intake

Heroin is usually injected intravenously and most of it is processed into a closely-related opioid called morphine.

Heroine binds with the receptors of the natural opioid system to massively enhance the natural response. o It can do so because it is an agonist i.e., it mimics the action of another natural biochemical.

e. What is the long term effect of heroine?

The long-term effects of repeated heroin use on neural transmission include downregulation. Regular use of heroin over time means that opioid receptors on postsynaptic neurons are consistently binding with morphine molecules, which desensitizes them to the effects of the drug. This is the basis of tolerance.

7. In terms of evaluation: talk about either the strength of cocaine research or heroine research (2 pts)

Researchers conducted a lesion study in which they deliberately damaged the mesocorticolimbic pathway in mice brains. • Neurons in the mice were unable to produce levels of dopamine normally associated with reward and administering cocaine to the mice was not successful. This did not occur when the lesion were performed in other parts of the mouse's brain. This finding supports the view that cocaine's effects are due to the activity of dopamine in the brain's reward system.

OR

Once heroin was identified as an agonist that binds to opiate receptors, other drugs were developed with a reverse mode of action. Naloxone is an antagonist drug that blocks opiate receptors and prevents heroin/morphine from occupying them. Naloxone does not produce the euphoric feeling associated with heroin use, so it can help manage the withdrawal process and reduce symptoms. This is a treatment that developed from greater knowledge of the transmission effect of drugs.

8. Explain the process of Summation (2 pts)

A postsynaptic neuron can receive inhibitory or excitatory inputs from the neural network. Firing depends on summation or 'adding together' of signal over time (temporal summation) or space (spatial summation). The excitatory and inhibitory influences are summed If the net effect on the postsynaptic neuron is inhibitory then it is less likely to fire. If the net effect is excitatory the postsynaptic neuron is more likely to fire. The inside of the postsynaptic neuron becomes positively charged. Depolarisation takes place. The action potential travels down the dendrite towards the cell body and then along the axon.

9. What is the role of the limbic system as a predictor of aggression? Support it by giving an example of a study. (4 pts)

The key structure involved in aggression is the amygdala. The reactivity of the amygdala in humans is proven to be an important predictor of aggressive behaviour. For example, Emil Coccaro et al. (2007) Studied people with intermittent explosive disorder (IED). The participants' brains were scanned by fMRI while they viewed images of faces. IED participants showed high levels of amygdala activity when viewing images of angry faces, a response not found in non-IED controls. This evidence of an association between amygdala reactivity and aggression is especially meaningful because an angry facial expression is an ecologically valid sign of threat (i.e., it exists in the real world).

10. What is the role of the prefrontal cortex as a predictor of aggression? Support it by giving an example of a study. (4 pts)

Brain Structure: Role of the Prefrontal Cortex The orbitofrontal cortex (OFC) is also found to be responsible for determining aggression. The OFC is a region of the prefrontal cortex just above the eye sockets (the orbits). It plays an important role in higher-cognitive functions (e.g. rational thinking and decision-making). It is involved in self-control, impulse regulation, and inhibition of aggressive behaviours.

Raine et al. (1997)

- Used PET scans to study murderers whose crimes included an element of reactive aggression.
- They found greater glucose metabolism (a measure of activity) in the amygdala, but abnormally low metabolism in the prefrontal cortex (including the OFC).

11. What role does the serotonin play in aggression? Elaborate. (4 pts)

Serotonin is a neurotransmitter with widespread inhibitory effects on transmissions between neurons -- it slows down and dampens neuronal activity.

Serotonin also helps regulate sleep patterns. Normal levels of serotonin in the OFC are associated with a reasonable degree of behavioural self-control. Decreased serotonin destroys this link by reducing self-control and leading to more impulsive behaviours including aggression.

Virkkunen et al. (1994) • Compared levels of a serotonin breakdown product in the cerebrospinal fluid of violent impulsive and violent non-impulsive offenders. • The levels were significantly lower in the impulsive offenders, which indicates that serotonin is indeed linked to self-control. • These impulsive offenders also suffered sleep irregularities, which provided extra evidence that serotonin was playing a role in their impulsivity.

12. What role does dopamine play in aggression? Elaborate. (4 pts)

Dopamine is a neurotransmitter that has inhibitory effects in some areas of the brain and excitatory effects in others. It is involved in regulating motivation behaviour and our experience of reward. Its main role in aggression is due to its interaction with serotonin.

Seo et al. (2008) found that serotonin underactivity (hypofunction) stimulates dopamine overactivity (hyperfunction), both of which are linked with impulsivity and aggression. So, serotonin hypofunction is the primary cause of impulsive aggression and dopamine hyperfunction makes an additional contribution.

13. Define Evolution (2 pts)

The changes in inherited characteristics in a biological population over successive generations. Evolution happens because genetic differences between organisms create variation. Such variation arises because genes from parents are combined and also due to spontaneous mutations (changes) in genes.

14. What is the process of natural selection? (2 pts)

The major process that explains evolution whereby inherited traits that enhance an animal's reproductive success are passed onto the next generation and thus 'selected', whereas animals without such traits are less successful at reproduction and their traits are not selected.

This idea was proposed by Charles Darwin (1859) and is often called 'survival of the fittest'.

15. How did evolutionary theory explain aggression? (2 pts)

In human evolution, being able to protect yourself and your possessions (including partner and offspring) would all have enhanced survival and reproduction so would have been modified by natural selection. Guarding your partner Mate retention strategies are the often aggressive behaviours men use to retain their partners and prevent them from 'straying'.

According to Wilson and Daly, direct guarding involves male vigilance over a partner's behaviours (e.g., checking who they've been seeing, coming home from work early, keeping tabs on their whereabouts, etc...) Guarding your offspring Example: Human parents will direct aggressive acts against other people (or animals) that threaten their children -- This aggression is adaptive because each child is a valuable genetic commodity.

Aggression is a way for parents to protect their 'investment', increasing the offspring's reproductive chances later in life.

16. Define catharsis and how is it used to explain aggression? (2 pts)

Catharsis: expressing aggression (venting anger) reduces the aggressive drive and makes further aggression less likely.Aggression is an instinctive drive that can be satisfied by catharsis Preventing catharsis creates a build-up of energy which will eventually produce a destructuive aggressive outburst directed either inwards (e.g., suicide, self-harm) or outwards (e.g., violent assault).

Freud believed that direct expression of the impulse in aggressive behaviour was most beneficial.

However, catharsis can be achieved in a variety of indirect ways:

1. Displacement, in which aggression towards one person (e.g. your boss or 'the government") is redirected against a less powerful and more available substitute (e.g., a younger sibling, an animal, or even an object).

2. Observing others behaving aggressively (e.g., in violent films or video games).

17. What is the dual hormone –hypothesis? Elaborate. (4 pts)

Hormonal causes of aggression are much more complex than the role of a single hormone implies. The dual-hormone hypothesis highlights the role of a second hormone -- cortisol -- secreted by the adrenal glands to protect the body against the effects of stress. There is an interaction between the systems responsible for regulating aggression and the stress response, such that:

High levels of testosterone lead to aggressive behaviour only when levels of cortisol are low.

When cortisol is high, testosterone's influence on aggression is blocked. So according to the dual-hormone hypothesis, the combined activity of testosterone and cortisol may be a better predictor of human aggression than either hormone alone.

18. Explain Female aggression and then elaborate through a study done by Dabbs and Hargrove (1997) which provides evidence of testosterone effects in females. (2 pts)

Although testosterone levels in female are (on average) lower than in males, female aggressive behaviour may still be enhanced by this hormone. Dabbs and Hargrove (1997) provided evidence for this (this is a strength in evaluation). However, researchers also found that women given a dose of testosterone behaved more generously and sociably in a lab-based negotiating game. The testosterone-aggression link in females appears to be more complex than it is in males, suggesting that non-biological factors (e.g., related to gender roles) may be important.

Measured testosterone in the saliva of 87 female inmates of a maximum security prison. They found that the degree of criminal violence used by these women was positively correlated with testosterone levels. Testosterone also correlated with the extent of women's aggressive dominance within the prison. The aggression-testosterone link so often found in male prisoners was replicated in this study of females, increasing the validity of the association.