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I declare this is my own work.

INTERNATIONAL AS PSYCHOLOGY

Unit 2 Biopsychology, Development and Research Methods 1

Friday 30 May 2025

07:00 GMT

Time allowed: 1 hour 30 minutes

Materials

For this paper you must have:

- a calculator, which you are expected to use where appropriate.

Instructions

- Use black ink or black ball-point pen.
- Fill in the boxes at the top of this page.
- Answer **all** questions.
- You must answer the questions in the spaces provided. Do not write outside the box around each page or on blank pages.
- All working must be shown.
- If you need extra space for your answer(s), use the lined pages at the end of this book. Write the question number against your answer(s).
- Do all rough work in this book. Cross through any work you do not want to be marked.

Information

- The marks for questions are shown in brackets.
- The maximum mark for this paper is 90.

For Examiner's Use	
Section	Mark
A	
B	
C	
TOTAL	



J U N 2 5 P S 0 2 0 1

Section A: Biopsychology

Answer **all** questions in the spaces provided.

0 1

What is meant by localisation of function in the brain?

[1 mark]

Localisation of function is the idea that certain functions (e.g. language, memory) occur only in specific areas of the brain.

0 2

Name a localised area of the brain **and** outline its function.

[2 marks]

Broca's area, in the frontal lobe of the left hemisphere.

It is responsible for speech production: it controls the planning and production of fluent, articulate speech (language production).

0 3

Using **one** example of a named gland, briefly explain the function of glands **and** hormones in the human body.

[3 marks]

Named gland: the adrenal gland (adrenal medulla).

Glands are organs that release hormones into the bloodstream. Hormones are chemicals that travel in the blood and act on target organs to alter their function or release other hormones, e.g. the adrenal medulla releases adrenaline, which increases heart rate for fight or flight.



0	4
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Describe the function of the peripheral nervous system.

[4 marks]

The peripheral nervous system (PNS) is the intermediary between the central nervous system (CNS) and the body. It collects sensory information through sensory receptors and transmits it to the CNS for processing. It conveys motor commands from the CNS to muscles and glands. The somatic division controls voluntary movement, and the autonomic division controls involuntary processes such as heart rate and digestion.

0	5
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Explain **one** strength of split-brain research.

[4 marks]

One strength of split-brain research is that it used highly controlled, standardised procedures. Sperry (1968) controlled exposure time to the stimulus, distance to the screen and which visual field the image was projected into, so it reached only one hemisphere. This gives good internal validity and convincing support for hemispheric lateralisation. The control also makes the research replicable, and later studies (e.g. Gazzaniga, 2005) found similar results, so it is reliable.

Turn over for the next question



0 6

Describe the procedure **and** findings of **one** study into plasticity.

[4 marks]

Maguire et al. (2000) took MRI scans of 16 right-handed male London taxi drivers who had driven taxis for more than 1.5 years and compared them with scans of 50 healthy right-handed males who did not drive taxis.

The taxi drivers had more grey matter in the posterior hippocampus than the controls. There was a positive correlation between time spent as a taxi driver and the volume of the right posterior hippocampus.

0 7

Mariam is pouring hot water into her cup. She pours some water over her fingers and quickly drops the cup.

Using your knowledge of the functions of sensory neurons **and** relay neurons **and** motor neurons, explain why Mariam drops the cup.

[6 marks]

Receptors in the skin of Mariam's fingers detect the heat and pain from the hot water. Sensory neurons carry this information as nerve impulses from the receptors in her fingers through the PNS to the spinal cord in the CNS. This is a reflex arc.

In the spinal cord, relay neurons receive the message from the sensory neurons. They process the sensation of heat and pain caused by the hot water and pass the message on to motor neurons, initiating a motor response to remove Mariam's fingers from the heat source.

Motor neurons carry the message from the spinal cord back to the muscles in Mariam's fingers and hand. The muscles respond so that she moves her fingers away from the heat; she relaxes her grip and drops the cup, very quickly and without conscious thought.



0 8

Enrico is 4 years old and has just had brain surgery. Following the surgery, Enrico is unable to move his left leg.

In a conversation with Enrico's parents, the doctor tells them that Enrico may recover some movement in his left leg.

Explain how plasticity and/or functional recovery after trauma might enable Enrico to use his leg again.

[6 marks]

Functional recovery is the recovery of abilities lost after brain trauma such as Enrico's surgery. As Enrico is only 4, his brain is very plastic, so it can compensate for the lost function and he should regain some use of his left leg. Undamaged areas around the damaged motor area in his right hemisphere can be stimulated to take over control of the leg. Axon sprouting forms new connections with undamaged neurons, and remaining axons become super-sensitive, responding to lower levels of stimulation. Dormant synapses can also be unmasked, opening new neural pathways to his leg muscles.

His recovery will depend on his rehabilitation programme and his perseverance with leg exercises, which stimulate the affected brain area.

30

Turn over for the next section

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Section B: Cognitive Development

Answer **all** questions in the spaces provided.

Only **one** answer per question is allowed.

For each multiple-choice question completely fill in the circle alongside the appropriate answer.

CORRECT METHOD



WRONG METHODS



If you want to change your answer you must cross out your original answer as shown.



If you wish to return to an answer previously crossed out, ring the answer you now wish to select as shown.



0 9

Which of the following terms is **not** part of Piaget's theory of cognitive development?

Shade **one** box only.

[1 mark]

A Conservation



B Egocentrism



C Equilibration



D Scaffolding



1 0

Describe how Piaget explains schema development through the processes of assimilation **and** accommodation.

[3 marks]

Children use existing schemas to make sense of the world. Through assimilation, new information or experiences are incorporated into an existing schema, e.g. calling a cat a dog. When new information does not fit, the schema is changed through accommodation, e.g. learning cats differ. This ongoing process leads to more complex schemas.



1 1

Evaluate research investigating the role of the mirror neuron system in social cognition.

[6 marks]

A strength of mirror neuron research is that animal studies allow invasive techniques. Di Pellegrino et al. (1992) and Rizzolatti et al. (1996) implanted electrodes into the premotor cortex of macaque monkeys and recorded individual neurons firing both when a monkey grasped food and when it watched a researcher do the same. This precise measurement of single neurons would be unethical with humans, so it gives direct evidence that mirror neurons exist. However, there are problems generalising from monkeys to humans. Monkeys have mirror systems but their social cognition is far less developed, for example they show little deception or understanding of others' beliefs. It is therefore unclear whether mirror neurons can explain complex human social cognition such as empathy and theory of mind.

Extra space On the other hand, human research using fMRI, such as Iacoboni et al. (1999), found similar areas (e.g. the inferior frontal cortex) active when people made and observed finger movements. This is objective, scientific evidence showing that the animal findings are also relevant to humans.

But fMRI evidence is correlational and measures activity in whole brain areas, not individual neurons. Activity may simply reflect watching movement rather than understanding the intentions or emotions of others, so we cannot conclude that mirror neurons cause social cognition.



1 2

Yonda is 6 months old and takes part in a violation of expectation study. She is shown a truck moving along a track and disappearing into a tunnel.

There are **two** conditions in the study.

Condition 1: the truck enters the tunnel and can be seen coming out of the tunnel.

Condition 2: the truck enters the tunnel but does not come out.

The researcher found that Yonda looked at the tunnel for longer in **Condition 2** than in **Condition 1**.

Describe and evaluate Baillargeon's violation of expectation research. In your answer, refer to Yonda's responses in the study.

[20 marks]

Baillargeon developed the violation of expectation (VOE) method as an experimental way of assessing young infants' understanding of the physical world, such as object permanence, without relying on them reaching for hidden objects as Piaget did. It is based on the visual preference technique: the assumption is that infants look longer at a stimulus that is unfamiliar or surprising to them, so a longer looking time shows that an event has violated their expectations. Looking time is measured, for example with eye tracking technology.

There are two stages. First, the infant is habituated to an event by being shown it repeatedly until they stop responding to it, e.g. a toy train goes into a tunnel and re-emerges. Second, infants are shown either an expected (possible) event or an unexpected (impossible) event that violates the physical rules, such as the train going into the tunnel and not coming out, or a different object coming out instead.

In Baillargeon et al. (1985), 5-month-old infants were habituated to a screen (drawbridge) rotating through 180 degrees. A box was then placed behind the screen. In the possible event the screen stopped when it reached the box; in the impossible event it seemed to rotate through



the space the box occupied. Infants looked longer at the impossible event, suggesting they knew the hidden box still existed and was solid. Baillargeon and DeVos (1991) found similar results in infants as young as 3.5 months. Later research investigated different types of event, including occlusion, containment, covering and support. Baillargeon concluded that infants have innate object knowledge, or an innate ability to learn quickly about the physical world, so object permanence develops much earlier than Piaget claimed.

Yonda's responses can be explained using this research. In Condition 1, the truck enters the tunnel and comes out again. This is the expected (possible) event: Yonda expected the truck to reappear, so her expectations were not violated and she did not spend long looking at the tunnel. Condition 2 is the unexpected (impossible) event, because the truck should have reappeared but did not. This violated Yonda's expectations and surprised her, so she looked at the tunnel for longer.

This suggests that at only 6 months Yonda understands that the truck continues to exist inside the tunnel, showing object permanence, even though Piaget would argue she is too young to have it.

A strength of VOE research is that it is an improved method of studying infants' understanding compared with Piaget's. Piaget's task required infants to reach for hidden objects, so he may have underestimated them because of their limited motor skills. Baillargeon showed that infants as young as 3.5 months understand object permanence without needing to reach for anything.

Another strength is that looking time is recorded with eye tracking technology, which is an objective and scientific measure. The procedures are standardised and highly controlled, for example all infants are



habituated first, so the research can be replicated and the results are reliable. The research is also supported by Kaufman et al., who used brain scans and found that infants showed increased brain activity when an object unexpectedly disappeared, supporting the idea that they had expected it to still exist.

However, the method relies on inference. Researchers assume infants look longer because their expectations are violated, but we cannot know what they are thinking. Longer looking may only show that an event is novel or interesting, not that the infant understands that objects are permanent. Yonda may simply have been waiting for the truck to appear.

There are alternative explanations for the findings. Bogartz and Rivera argued that infants simply prefer to watch a complete movement, such as the full 180 degree circle of the drawbridge, which is more familiar from the habituation stage. Haith suggested that the infant may still see an afterimage of the hidden blocks, so looking longer would reflect perception rather than knowledge of object permanence. These explanations lower the validity of Baillargeon's conclusions.

Extra space Finally, Baillargeon's work has been very influential. It has led to the development of several connectionist models of brain development. Overall, VOE research provides strong evidence that young infants such as Yonda have some understanding of object permanence, although the conclusions must be treated with caution because they are based on inferences from looking time.



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Section C: Research Methods 1

Answer **all** questions in the spaces provided.

A psychologist aims to investigate the possible relationship between playing sports and mathematical ability. For her study, she uses 20 tennis players from the local tennis club.

To collect the data for her co-variables, the psychologist asks every tennis player how many years they have been playing tennis.

She also gives each of the 20 tennis players a mathematics test with a maximum score out of 50.

1	3
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What is meant by co-variables?

[1 mark]

Co-variables are the two behaviours or qualities that are measured in a correlational analysis to see if they are related.

1	4
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Identify the co-variables in this study.

[2 marks]

The number of years each tennis player has been playing tennis.

Each tennis player's score (out of 50) on the mathematics test.

1	5
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What is meant by the hypothesis in a study?

[2 marks]

A hypothesis is a precise, testable statement that predicts the outcome of an investigation, written using clearly operationalised variables.



1 6

Write an appropriate non-directional hypothesis for this study.

[3 marks]

There will be a relationship (correlation) between the number of years a person has been playing tennis and their score (out of 50) on the mathematics test.

1 7

Explain why it is important to consider ethics in the design and conduct of psychological studies.

[3 marks]

Ethics are important to protect participants from being directly or indirectly harmed, physically or psychologically, and to make sure they are treated with respect, so they leave the study feeling no worse about themselves than before. Ethical research also upholds the integrity, credibility and trustworthiness of psychology, as harmed participants might take legal action or refuse to take part in future research.

Turn over for the next question



1 8

Consent is an ethical consideration.

Explain what information the psychologist should provide to the tennis players to enable them to give their consent to take part in the study.

[4 marks]

The psychologist should tell the tennis players the aim of the study, which is to investigate the relationship between playing tennis and their mathematics score, and what they must do.

She should tell them that taking part is voluntary and they have the right to withdraw at any point and to withdraw their data at the end.

She should also guarantee that their test scores will be confidential and anonymous and their personal information kept private.

1 9

What is meant by a positive correlation?

[2 marks]

A positive correlation is a relationship between two co-variables in which, as one variable increases in value, the other variable also increases in value.



The psychologist decides to do a follow-up experiment with the same 20 tennis players to see if playing tennis has a direct effect on the ability to solve mathematical questions.

For this experiment, she paired up the tennis players on their mathematical ability by using their scores on the mathematics test they had done previously.

Each tennis player takes part in **one** of the following conditions.

Condition 1: playing tennis for 60 minutes.

Condition 2: sitting quietly for 60 minutes.

After the 60 minutes, the tennis players were asked to answer a new mathematical test.

2 0

Identify the experimental design used in this study. Briefly explain your answer.

[2 marks]

Matched pairs design.

The tennis players were paired using their scores on the previous mathematics test, and one player from each pair did each condition.

2 1

Describe how the psychologist could have randomly allocated the players to the two conditions of the experiment.

[3 marks]

For each of the 10 matched pairs, the psychologist could prepare two slips of paper, one with the number 1 and one with the number 2, put them in a hat and ask each of the two tennis players to draw one slip.

The player who draws number 1 is allocated to Condition 1 (playing tennis for 60 minutes) and the player who draws number 2 is allocated to Condition 2 (sitting quietly for 60 minutes).

This process is repeated for all matched pairs until all 20 players have been allocated to one condition.



2 2

Identify the fully operationalised independent variable of this experiment.

[2 marks]

Whether the tennis players played tennis for 60 minutes (Condition 1) or sat quietly for 60 minutes (Condition 2) before the new mathematics test.

2 3Identify **one** extraneous variable in the follow up experiment. Briefly explain how this extraneous variable might affect the results.**[2 marks]**

Level of mathematics education: some players may have studied mathematics for longer or at a more advanced level, so they might perform better on the new mathematics test regardless of condition.

2 4

What is meant by demand characteristics?

[2 marks]

Demand characteristics are cues in a study that participants use to work out the aim of the research, which may change how they behave, so they become confounding variables.

2 5

Briefly explain how demand characteristics could have affected this study.

[2 marks]

The psychologist used players from her local tennis club, so she might know them. They might guess the aim and try harder on the test after playing tennis to please her (or do worse to spoil the results).

30**END OF QUESTIONS**

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