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INTERNATIONAL AS PSYCHOLOGY

Unit 2: Biopsychology, Development and Research Methods 1

Friday 17 January 2020 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	



Section A: BiopsychologyAnswer **all** questions in the spaces provided.Only **one** answer per question is allowed.

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

CORRECT METHOD



WRONG METHODS



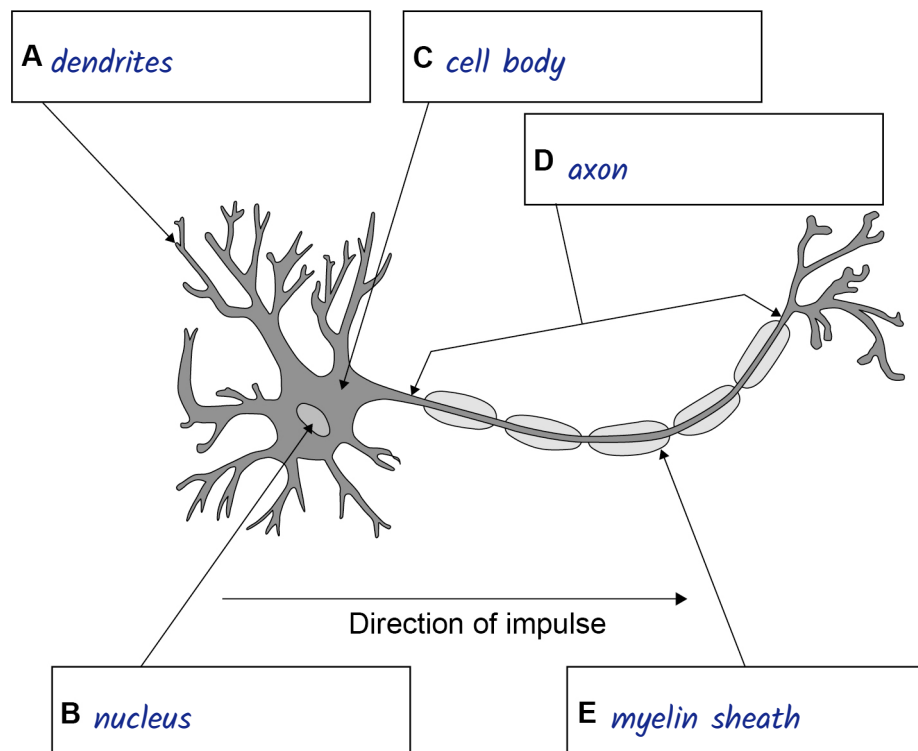
If you want to change your answer you must cross out your original answer as shown.



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



0 1

Below is a diagram of a motor neuron (**Figure 1**). Name the structures labelled **A–E**. Write the name of **each** structure in the relevant box.**[5 marks]****Figure 1**

0 2

Which of the following is **not** a division of the nervous system?

Shade **one** box only.

[1 mark]

A Autonomic

☐

B Central

☐

C Motor

☒

D Peripheral

☐

0 3

Ben was driving to work one morning when he noticed a large hole in the road. He slowed down and was able to avoid the hole by driving around it.

Explain how Ben's somatic nervous system is involved in his behaviour.

[6 marks]

Ben's somatic nervous system connects his central nervous system (brain and spinal cord) to the skeletal muscles of his body and to his sense organs, and it allows control of voluntary movement.

When Ben notices the hole in the road, sensory receptors in his eyes detect the hole ahead and sensory (afferent) neurons relay this information to his brain (CNS), where it is processed and a decision is made to avoid the hole.

Ben's brain then sends signals to his muscles to take appropriate action. Motor (efferent) neurons carry the information from his brain and spinal cord to the muscle fibres in his legs and arms.

This allows Ben to press the brake with his foot so that he slows down, and to turn the steering wheel with his arms to drive around the hole. These are voluntary movements made through his skeletal muscles, which is exactly what the somatic nervous system controls.

Turn over ►



0 4

Describe the function of the endocrine system.

[9 marks]

The endocrine system is a network of glands throughout the body whose main function is to control and regulate the activity of particular cells or organs. It works alongside the nervous system but acts more slowly and its effects last longer.

Glands secrete chemical messengers called hormones directly into the bloodstream (circulatory system). The hormones travel in the blood to target organs, where they bind to receptors on cells that are sensitive to them. Hormones released by these glands are vital to most of the physiological functions of the body, such as growth, metabolism, reproduction and the stress response.

The pituitary gland in the brain is called the 'master gland' because, rather than having a direct effect on body tissues, its main function is to release hormones that control the other endocrine glands. The hypothalamus controls the release of hormones from the pituitary gland, so it is considered to have general control of the endocrine system, linking it to the nervous system.

Examples of other key glands include: the thyroid, which releases thyroxine to regulate metabolic rate; the testes, which release androgens such as testosterone for the development of male characteristics at puberty; the ovaries, which release oestrogens to regulate the female reproductive system; and the pineal gland, which releases melatonin to regulate biological rhythms such as the sleep/wake cycle.

The adrenal glands have two parts. The adrenal medulla releases adrenaline and noradrenaline in the fight or flight response: when a threat is perceived, the hypothalamus activates the sympathetic nervous



system, which stimulates the adrenal medulla, and adrenaline increases heart rate and breathing and releases glucose for energy so the body is ready to fight or flee. The adrenal cortex releases glucocorticoids such as cortisol, which release glucose and suppress the immune response, and mineralocorticoids, which regulate the water balance of the body.

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0 5

Describe and evaluate **one** split-brain research study.**[9 marks]**

Sperry (1960s) studied split-brain patients who had had their corpus callosum cut to treat severe epilepsy. Because the corpus callosum is cut, a stimulus sent to the right hemisphere cannot be transmitted to the left hemisphere, and vice versa. Sperry used a procedure known as the divided visual field: the patient fixated on a point in the centre of a screen while an image or word was flashed (for about one tenth of a second) to the left or right visual field. Information in the right visual field goes to the left hemisphere and information in the left visual field goes to the right hemisphere, so stimuli could be presented to each hemisphere separately.

When a word or picture was shown to the right visual field (left hemisphere), patients could say and write what they had seen. When it was shown to the left visual field (right hemisphere), they said they had seen nothing, but they could select the matching object by touch with their left hand, showing the right hemisphere had recognised it and had some basic language ability (word comprehension). Later research using non-verbal stimuli such as faces (e.g. Gazzaniga) found the right hemisphere was better at matching shapes and showed superiority on visuo-spatial tasks. The evidence supported a verbal left hemisphere and a visuo-spatial right hemisphere. Turk et al (2002) later found that although the right hemisphere is generally better at face processing, the left hemisphere plays an important role in self-recognition.

A strength is that Sperry's research was groundbreaking and changed our view of hemisphere function, and findings from a variety of studies have led to a general model of hemispheric lateralisation. The procedure was

Turn over ►



also highly controlled and standardised, using precise timing and fixation, which increases internal validity and makes it replicable.

However, the sample was small: there are very few split-brain patients and only around 10 to 15 have been studied extensively, making it difficult to generalise. The patients were also a very varied group in gender, age and handedness, and their operations were not always comparable; for example, in some cases the anterior commissure was not cut, which may allow limited communication between the hemispheres.

Their long history of epilepsy may also have altered their brain organisation, so findings may not apply to neurotypical brains.

Nevertheless, Sperry's techniques have since been modified for use with intact (neurotypical) participants, which has helped address this issue.



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Turn over for Section B

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Section B: Cognitive development

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

0	6
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Two brothers, Ben and Kit, were playing with their toy cars. Ben placed his red car in the toy box and went outside. Kit watched his mother move the red car and place it behind the cushion. She then asked Kit, "Where will Ben look for his red car when he comes back?" Kit answered, "Ben will look behind the cushion."

Explain what Kit's answer suggests about his development of a theory of mind.

[4 marks]

Kit's answer suggests that he has not yet developed a theory of mind, because he did not answer the 'belief' question correctly.

By saying that Ben will look behind the cushion, Kit shows that he cannot attribute a false belief to Ben. Kit is unable to take Ben's perspective and understand that Ben's mind has a different viewpoint from his own. He thinks that Ben will know what he knows about the whereabouts of the red car after his mother moved it, even though Ben was outside and did not see this happen.

If Kit had given the correct answer, that Ben will look in the toy box, it would have shown that Kit understood that Ben holds a false belief, and so that he had developed a theory of mind.



0	7
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Briefly discuss **two** limitations of Sally-Anne studies.

[4 marks]

One limitation is that the Sally-Anne test can only be used with people who have sufficiently developed language skills, as they must understand the story, the instructions and the questions. Children with limited language may fail because of this rather than because they lack a theory of mind, so the test may underestimate their ability.

A second limitation is that the test may not be testing theory of mind alone. Bloom and German (2000) suggest false belief tasks also test other cognitive processes such as memory: when children with ASD are given visual aids to help them remember, they perform much better. The study also lacks mundane realism, as it is a story about dolls with little relevance to real-life social situations.

Turn over for the next question

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0 8

A researcher conducted a violation of expectation experiment.

In **Stage one**, the researcher showed all the infants a toy train enter a tunnel and come out at the other end.

In **Stage two**, the researcher divided the infants into two groups. Infants in **Group A** saw the train enter the tunnel and come out at the other end; infants in **Group B** saw the train enter the tunnel, but not come out.

It was found that infants in **Group B** looked at the tunnel for a longer time than infants in **Group A**.

Explain what is meant by violation of expectation. Refer to the above study in your answer.

[4 marks]

Violation of expectation is a technique used to investigate very young infants' understanding of the physical world. An expectancy of a physical event is created and then an unexpected (impossible) event happens. If the infant spends more time looking at the unexpected event, it is assumed that they had formed an expectation about what should happen and that this expectation has been violated.

In this study, Stage one created the expectation that the train would come out of the tunnel. Group A were shown an expected event, as they had previously seen the train enter the tunnel and reappear. Group B had their expectation violated, as the train did not reappear, leading to increased interest and looking at the tunnel for longer.



0 9

Outline the **first two** stages of Piaget's stages of intellectual development.**[6 marks]**

Stage 1 is the sensorimotor stage (0 to 2 years). Very young infants deal with the world using simple reflexes, e.g. sucking. At about 6 weeks these become 'primary circular reactions' initiated by the baby, e.g. grasping a toy, followed by more complex secondary and tertiary circular reactions. The infant learns through senses and actions. In this stage the child develops object permanence, the understanding that objects continue to exist even when out of sight, which occurs at around 8 to 9 months.

Stage 2 is the pre-operational stage (2 to 7 years). By 2 years the child is mobile and can use language but still lacks logical reasoning ability. Piaget identified several mental tasks children cannot do in this stage. Egocentrism is the inability to see things from other people's viewpoints, as shown in the 'three mountains task'. They also lack class inclusion: they are unable to understand how categories of objects relate to each other. And they lack conservation: they cannot understand that when the shape or appearance of an object changes, the overall quantity remains the same if nothing is added or taken away.

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1 0

Describe and evaluate Vygotsky's theory of cognitive development.

[12 marks]

You may use this space to plan your answer.

Vygotsky's sociocultural theory emphasised the role of social and cultural factors in cognitive development. He argued that children are born with elementary mental functions, such as attention and perception, which are transformed into higher mental functions, such as reasoning and problem solving, through social interaction. Each child acquires the tools of their own culture, especially language, which is the most important cultural tool.

Language plays a key role in thought. At first speech is social, used to communicate with others. Children then use egocentric (private) speech, talking aloud to guide their own actions, and at about age 7 to 8 this speech becomes internalised as inner (intellectual) speech, the basis of thought. Vygotsky also described concept formation, in which children progress from grouping objects randomly, through complexes, to forming true abstract concepts.

Vygotsky was particularly interested in the child's interaction with more knowledgeable others (MKOs), such as parents, teachers or older peers. He introduced the zone of proximal development (ZPD): the gap between what a child can achieve alone and what they can achieve with



the help of an MKO. Learning takes place within the ZPD. The concept of scaffolding (Wood, Bruner and Ross) was later applied to his theory: the MKO gives support that is gradually withdrawn as the child becomes competent, so the child is seen as an apprentice to the MKO.

There is research evidence to support Vygotsky's theory. Wood and Middleton (1975) observed mothers helping 4-year-olds build a block model and found that the most effective mothers used contingent scaffolding, giving more help when the child struggled and less when they succeeded, supporting the role of an MKO working within the ZPD. Vygotsky's ideas also have practical applications to education, for example peer tutoring, collaborative group work and teachers scaffolding tasks to a child's level, which have been shown to help learning. This is a strength as it shows the theory is useful.

However, guidance and instruction may not always have a positive influence. Too much support from an MKO could lead to a lack of motivation or independence, and some children may learn just as well through self-discovery, so the theory may overstate the importance of instruction. Vygotsky's concepts, such as the ZPD, are also vague and hard to measure objectively, making the theory difficult to test scientifically.

In contrast to Piaget, Vygotsky believed that development could be accelerated to some extent, through the ZPD and collaborative learning, rather than children having to wait until they are biologically ready. Vygotsky also focused on the process of cognitive development rather than the outcomes (stages) that Piaget emphasised, and gave more weight to culture and social context, which helps explain cultural differences in thinking. However, Vygotsky may underestimate the role of

Turn over ►



biological maturation and the child's own active exploration, so the best explanation may combine the two theories.

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Section C: Research methods 1

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

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

For each 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.



A researcher investigated the effect of sleep disruption on learning and recall. In a research room at the university, 10 male university psychology students took part in both of the conditions shown below.

Condition 1: the participants were woken by a loud alarm as they slept (sleep disruption condition). Then they were allowed to go back to sleep. The following morning, the participants were given a list of 25 words to learn and recall.

Condition 2: the same participants were left to sleep undisturbed for the whole night (no sleep disruption condition). The following morning, the participants were given a similar list of 25 words to learn and recall.

The two conditions were separated by a week and the experiment was counterbalanced.

The researcher recorded the number of words correctly recalled in each condition.

Table 1: The mean number of words correctly recalled and the standard deviation for both conditions

	Condition 1 (Sleep disruption)	Condition 2 (No sleep disruption)
Mean	9	17
Standard deviation	2.5	1.5



1 1

What do the mean and standard deviation values in **Table 1** suggest about the participants' performances with sleep disruption and without sleep disruption? Justify your answer.

[4 marks]

The means suggest that participants performed better on learning and recall without sleep disruption than with sleep disruption, because the mean number of words recalled in Condition 2 (no sleep disruption) is greater than in Condition 1 (sleep disruption).

The standard deviations suggest that recall was more consistent (less variable) without sleep disruption than with sleep disruption, because the standard deviation is smaller in Condition 2 than in Condition 1.

1 2

Name an appropriate graph to display the mean values shown in **Table 1**.

[1 mark]

Name of graph *A bar chart*

1 3

Briefly explain why the researcher should not generalise these results to all university students.

[2 marks]

The sample consisted only of 10 male university psychology students, so it is only representative of male students studying that particular subject. The results can therefore only be generalised to a similar population of male psychology undergraduates and not to female students or students of other subjects.

Turn over ►



1 4

Identify the type of experiment used in this study.

Shade **one** box only.**[1 mark]****A** Field☐**B** Laboratory☒**C** Natural☐**D** Observation☐**1 5**

Name the experimental design used in this study. Justify your answer.

[2 marks]

Repeated measures design, because the same participants took part in both Condition 1 (sleep disruption) and Condition 2 (no sleep disruption).

1 6

Write a non-directional hypothesis for this study.

[3 marks]

There will be a difference in the number of words correctly recalled from a list of 25 words between participants who were woken by a loud alarm during the night (sleep disruption, Condition 1) and participants who slept undisturbed for the whole night (no sleep disruption, Condition 2).



1 7

Outline **one** reason why researchers use counterbalancing.

[2 marks]

To control for order effects, a potentially confounding variable in a repeated measures design caused by the order in which the conditions are presented. Participants may perform better in the second condition due to practice, or worse due to fatigue or boredom.

1 8

Explain how counterbalancing could have been carried out in this study.

[2 marks]

Half the participants (participants 1 to 5) would first learn a list of 25 words after sleep disruption (Condition 1), then a week later learn a list without sleep disruption (Condition 2). The other half (participants 6 to 10) would do Condition 2 first, followed by Condition 1.

1 9

The researcher wanted to investigate in more detail how the participants felt about the sleep experiment. He decided to carry out an unstructured interview with five participants from the original experiment. The five participants were selected randomly.

Explain how the five participants could have been randomly selected for the interviews.

[3 marks]

The names of all 10 participants from the original experiment could be written on identical slips of paper and placed in a container (hat).

Five names would then be drawn out one at a time without looking.

These five participants would then be the random sample for the unstructured interviews, as each of the 10 had an equal chance of being selected.

Turn over ►



2	0
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Briefly discuss **one** limitation of using unstructured interviews in this study.

[4 marks]

One limitation is that unstructured interviews are subject to demand characteristics and social desirability bias. Because this study used a repeated measures design, participants learned two word lists, one with and one without sleep disruption, so they could work out what the researcher was investigating. In the interview they might then say what they think the researcher wants to hear (the 'please you' effect), or deliberately the opposite (the 'screw you' effect), or give answers that present themselves in a good light, for example denying they felt tired or anxious. This would reduce the validity of the qualitative data about how they felt about the sleep experiment. Also, the interviewer could unconsciously bias answers by asking leading questions, such as 'Why do you think you did better without sleep disruption?'.

2	1
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During the interviews one student reported feeling anxious about the sleep experiment. Briefly explain how the researcher could have dealt with this issue at the end of the study.

[2 marks]

At the end of the study, as part of the debrief, the researcher should ask all participants whether they experienced any harm or distress, and offer them counselling (or similar support) to deal with the anxiety.



2	2
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Explain how this research involved the collection of both qualitative and quantitative data.

[4 marks]

The experiment involved the collection of quantitative data, because the number of words correctly recalled in each condition was measured, which is numerical data.

The unstructured interviews involved the collection of qualitative data, because the data collected would be in words, what the participants actually said about how they felt about the sleep experiment, which is non-numerical.

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END OF QUESTIONS



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