

Please write clearly in block capitals.

Centre number

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Candidate number

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Surname

StemUp Model Solution

Forename(s)

Candidate signature

I declare this is my own work.

A-level PSYCHOLOGY

Paper 2 Psychology in context

Time allowed: 2 hours

Materials

For this paper you may use:

- a calculator.

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.
- 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 96.
- Questions should be answered in continuous prose. You will be assessed on your ability to:
 - use good English
 - organise information clearly
 - use specialist vocabulary where appropriate.

For Examiner's Use	
Section	Mark
A	
B	
C	
TOTAL	



Section A**Approaches in psychology**

Answer **all** questions in this section.

0 1

Outline the way in which Pavlov studied classical conditioning.

[4 marks]

Pavlov studied the salivation reflex in dogs. He found that food (an unconditioned stimulus, UCS) naturally produced salivation (an unconditioned response, UCR). A bell (a neutral stimulus) produced no salivation. He repeatedly rang the bell just before presenting the food, so the two were paired close together in time (temporal contiguity). After several pairings the bell alone made the dogs salivate: it had become a conditioned stimulus (CS) producing a conditioned response (CR), showing learning by association.

0 2

Some critics have said that Pavlov's studies may lack ecological validity.

What is meant by the term ecological validity?

[2 marks]

Ecological validity is the extent to which the findings of a study can be generalised beyond the research setting, i.e. how far the behaviours observed and recorded in the study reflect the behaviours that actually occur in real-life, everyday settings.



0 3

Jemima and Lily are identical twins. Lily complains to Jemima, "I don't understand it. If we have the same genes, how come you have clearer skin than me and are much better at netball?"

Jemima laughs and replies, "Lily, we may be identical twins, but we are not identical people."

Using your knowledge of genotype and phenotype, explain Lily's **and** Jemima's comments.

[4 marks]

Lily is referring to their genotype, an individual's genetic make-up. As identical (MZ) twins, Lily and Jemima share 100% of their genes, so they have identical genotypes.

Jemima is referring to their phenotype, the observable characteristics of an individual, which result from the interaction of their genotype with the environment. Jemima may have a different skincare routine, diet or sun exposure, giving her clearer skin, and may have practised netball more or started lessons earlier, so their phenotypes differ.

Turn over for the next question

Turn over ►



0 4

Lily and Jemima have a pet rat, which usually hides in a corner when they try to take it out of its cage. They have tried different ways to stop the rat hiding, but so far without success.

Use your knowledge of **two** types of reinforcement to suggest how Lily and Jemima could train their rat to come to the cage door when they open it.

[6 marks]

Lily and Jemima could use operant conditioning. Firstly, positive reinforcement strengthens a behaviour by adding a pleasant consequence. Each time they open the cage door and the rat comes to it, they immediately give it a treat, such as a chocolate drop. Because coming to the door is rewarded, the rat will be more likely to repeat the behaviour next time the door is opened.

They could use shaping, at first rewarding any movement out of the corner towards the door, then only closer approaches. Once learned, they could switch to a variable ratio schedule, rewarding only some of the time, so the behaviour resists extinction.

Secondly, negative reinforcement strengthens a behaviour because it removes something unpleasant. When they open the cage they could play a loud noise
 Extra space *or gently spray the rat with water, and stop as soon as the rat comes to the door. Coming to the door lets the rat escape the unpleasant stimulus, so it will be more likely to come to the door whenever Lily and Jemima open the cage.*



0 5

Compare the humanistic approach with the psychodynamic approach.

[8 marks]

One difference concerns free will and determinism. The humanistic approach (Rogers, Maslow) assumes people have free will and are active agents who can choose how to behave. In contrast, Freud's psychodynamic approach is psychically deterministic: behaviour is caused by unconscious forces, such as conflict between the id, ego and superego, beyond conscious control.

Humanism is therefore more optimistic about people's capacity to change.

Both take an interactionist view of nature and nurture. In humanism, everyone has an innate drive to self-actualise (nature), but conditions of worth and conditional positive regard from others create incongruence that blocks it (nurture). Similarly, the psychodynamic approach sees behaviour as driven by innate instincts (nature), while childhood experiences in the psychosexual stages shape personality and defence mechanisms (nurture).

Both are less scientific than other approaches. Humanism deliberately rejects the scientific method, taking an idiographic approach to subjective experience.

The psychodynamic approach relies on case studies such as Little Hans, and concepts such as the unconscious are unfalsifiable (Popper). However, unlike Rogers, Freud believed some aspects of behaviour could be investigated scientifically.

Both led to therapies. Rogers' client-centred counselling is non-directive: the therapist offers unconditional positive regard and empathy so the client can overcome conditions of worth and move towards self-actualisation. Freud's psychoanalysis is directive, using free association and dream analysis to bring unconscious conflicts into consciousness. Counselling is now widely used, e.g. in schools, whereas psychoanalysis is lengthy and costly.

Turn over ►

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Section B**Biopsychology**

Answer **all** questions in this section.

0 6

Describe the structure **and** function of a neuron.

[6 marks]

Neurons are cells that transmit electrical and chemical signals, enabling communication within the nervous system. The cell body (soma) contains the nucleus, which holds the genetic material. Branch-like dendrites extend from the cell body and receive signals from other neurons, carrying them towards the cell body. The axon carries the electrical impulse (action potential) away from the cell body. It is covered in a fatty myelin sheath, which insulates it and speeds transmission, as the impulse jumps between the gaps (nodes of Ranvier) in saltatory conduction. At the end of the axon are terminal buttons, which contain neurotransmitters in vesicles and form synapses with other cells. Sensory neurons carry messages from receptors to the CNS, relay neurons connect neurons within the CNS, and motor neurons carry messages from the CNS to muscles and glands.

0 7

Studies have identified Broca's area and Wernicke's area as responsible for language.

Outline the difference in function between Broca's area and Wernicke's area.

[2 marks]

Broca's area is responsible for speech production, enabling speech to be fluent, whereas Wernicke's area is responsible for language comprehension, enabling speech to be understood and meaningful.

Turn over ►

0 8

Discuss ways of studying the brain.

[16 marks]

You may use this space to plan your answer.

Functional magnetic resonance imaging (fMRI) detects changes in blood oxygenation and flow that result from neural activity: an active brain area uses more oxygen, so blood flow to it increases. fMRI uses a magnetic field and radio waves to produce a 3D moving picture of the brain, so activity in regions of interest during a task can be compared with a baseline task.

Electroencephalograms (EEGs) record electrical activity through electrodes fixed to the scalp, which detect neuronal activity directly below them, shown as brainwave patterns such as alpha and delta waves. Event-related potentials (ERPs) use the same electrodes, but a stimulus is presented many times and statistical averaging removes background activity, leaving only the responses linked to that stimulus.

Post-mortem examinations analyse the brain after death, correlating structural abnormalities with behaviour shown in life. For example, a post-mortem on Broca's patient 'Tan', who could only say one word, revealed a lesion in the left frontal lobe.

fMRI is non-invasive and, unlike PET, uses no radiation, so it is risk-free. It has high spatial resolution (1 to 2 mm), showing precisely which regions are active. However, its temporal resolution is poor, with a lag of about 5



seconds, so it cannot track the exact timing of activity. It is also expensive, leading to small samples that reduce validity, and its complex data depend on the baseline task used and how they are interpreted. As it measures blood flow, not neural activity directly, it cannot establish causation.

Nevertheless, fMRI research has provided valuable evidence, e.g. Maguire et al. (2000) found London taxi drivers had greater posterior hippocampal volume than controls, supporting brain plasticity.

EEGs and ERPs have excellent temporal resolution, accurate to the millisecond. EEG is useful in diagnosing epilepsy and studying sleep stages, while ERPs isolate specific cognitive processes such as attention. Both are much cheaper than fMRI, allowing larger samples that increase validity.

However, they have poor spatial resolution, only detecting activity near the surface, so deeper structures such as the hypothalamus cannot be studied and the source of activity is hard to pinpoint. ERP research also lacks standardised methodology between studies, making findings difficult to confirm.

Post-mortems, by contrast, allow detailed examination of deep brain regions, and provided the foundation for localisation of function through Broca's and Wernicke's discoveries. However, damage seen may be caused by other factors, such as illness, drug treatment or changes during or after death, so causation is unclear. Special permission is required, so samples are small, and patients such as HM may not have given fully informed consent.

Overall, unlike post-mortems, fMRI, EEG and ERPs let researchers study the living brain during specific tasks. As each technique has limitations, they are increasingly combined, e.g. fMRI for spatial detail with ERPs for timing, giving a more valid picture of brain function.

Turn over ►



[illegible]

[illegible]

24

Section C

Research methods

Answer **all** questions in this section.

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 placed an advert in a university psychology department asking for third year students to participate in a sleep experiment.

Each student had a sleep tracker watch to wear at home for the two-week study. Each morning they were asked to open the sleep tracker app to view their sleep quality data on their mobile phones. The students were unaware that the sleep data they could see on their phones had been manipulated by the researcher. Over the two weeks of the study, each student saw that he or she had had poor sleep quality for seven random nights of the experiment and good sleep quality for the remaining nights.

Every morning, after viewing the sleep data, each student completed a questionnaire about the previous night's sleep. One of the questions asked the students to rate how well rested they felt, on a scale from 1–10, after the previous night's sleep. Apart from this, students were asked to continue their normal everyday activities.

0 9 Which of the following best describes the experimental method used in this study?

Shade **one** box only.

[1 mark]

A Field experiment



B Laboratory experiment



C Natural experiment



D Quasi-experiment



1 0

Write a directional hypothesis the researcher might use for this study.

[3 marks]

Students will give a higher rating (on a scale of 1 to 10) of how well rested they felt on mornings when their sleep tracker app showed good sleep quality than on mornings when it showed poor sleep quality.

1 1

Which of the following best describes the sampling method used in this study?

Shade **one** box only.**[1 mark]****A** Opportunity sampling
☐
B Stratified sampling
☐
C Systematic sampling
☐
D Volunteer sampling
☒
1 2Explain **one** strength **and one** limitation of using this sampling method in this study.**[4 marks]**

Strength: volunteer sampling is quick and easy, as the researcher only had to place an advert in the psychology department and wait for students to respond. Also, the volunteers are willing to take part, so they are more likely to complete the daily questionnaire for the full two weeks.

Limitation: the sample is biased. Only third year psychology students at one university were recruited, all of similar age and academic level, and volunteers may differ, e.g. be more interested in sleep, so findings may not generalise.

Turn over ►

The researcher collected quantitative data about how well rested the students felt.

1 3

Explain **one** strength of collecting quantitative data in this study.

[2 marks]

Rating how well rested they felt on a 1 to 10 scale gives numerical data that are easy to analyse and compare, e.g. mean ratings after 'good' and 'poor' sleep nights, and a statistical test can be used to draw an objective conclusion.

One ethical issue in this study is deception, as the students were unaware that the sleep data they could see on their phones had been manipulated by the researcher.

1 4

Explain **one** way in which the researcher might deal with the deception in this study.

[2 marks]

At the end of the two weeks the researcher should give the students a full debrief, explaining that the sleep data on their phones had been manipulated and why, and offer them the right to withdraw their data.

Apart from the question about how well rested the students felt, the researcher's questionnaire contained nine other questions. The responses to these questions were not analysed.

1 5

Explain **one** reason why the researcher decided to include these additional questions on the questionnaire.

[2 marks]

The extra questions disguise the true aim, so students are less likely to realise the study was about how well rested they felt after seeing their sleep data. This reduces demand characteristics, increasing validity.



1 6

Explain **one** limitation of assessing sleep quality using a rating scale of 1–10.

[2 marks]

Sleep quality is subjective, so each student may interpret the scale differently, e.g. a rating of 3 may mean something different to one student than another. Students also cannot explain why they gave their rating.

The researcher believed that the actual number of hours slept by the students could have affected the results of the study.

1 7

Suggest **one other** extraneous variable that could have affected the results of this study. Explain why it would have been important to control this extraneous variable and how it could have been controlled in this study.

[4 marks]

Consumption of alcohol or caffeine in the evening before sleep. This needed to be controlled because drinking alcohol could make a student feel less rested the next morning, so they would give a low rating regardless of whether the sleep tracker showed good or poor sleep. Changes in the DV would then not be due to the manipulated sleep data (IV), reducing the internal validity of the study.

To control this, the researcher could instruct all students not to drink alcohol or caffeine after 6pm on every evening of the two-week study, and ask

Extra space *them to record anything they did drink so that data from these nights could be removed.*

Turn over for the next question

Turn over ►



In a follow-up study, the researcher investigated whether there was a correlation between the number of hours slept and how well rested the students felt.

The researcher randomly selected 18 participants from first-year students at the university.

On the day of the study, each student participant was asked, 'How many hours did you sleep last night?' They then had to rate on a scale of 1 to 5 how well rested they felt.

The researcher hypothesised that there would be a positive correlation between the two co-variables.

1 8

Outline **one** reason why it was appropriate to conduct a correlation rather than an experiment in this case.

[2 marks]

It would be difficult, and unethical, to dictate how many hours each student should sleep, as restricting sleep could harm their wellbeing and studies. A correlation measures the hours they naturally slept.

1 9

Describe how the researcher could have used random sampling to obtain the students for this study.

[3 marks]

The researcher would obtain a list of the names of all the first-year students at the university (the target population). Each name would be put into a hat or entered into a computer random name generator. Names would then be drawn out in an unbiased manner until 18 students had been selected.



The researcher used Spearman's rho statistical test to analyse the data from this study.

2 0

Explain why Spearman's rho was a suitable test for this study. Refer to the description of the study in your answer.

[4 marks]

Firstly, the researcher is testing a correlational hypothesis: he is investigating the relationship between two co-variables, the number of hours the students slept and how well rested they felt, predicting a positive correlation.

Spearman's rho tests for a correlation, not a difference.

Secondly, the data are at least ordinal level. How well rested the students felt was measured on an arbitrary rating scale of 1 to 5, which is subjective and not a standardised measure, so the intervals between points are not necessarily equal, but the data can be ranked. Spearman's rho is a

Extra space *non-parametric test suitable for ordinal data.*

Turn over for the next question

Turn over ►



The researcher chose to use the 5% level of significance and the calculated correlation coefficient for the Spearman's rho test was 0.395

Table 1 Critical values of rho

Level of significance for a one-tailed test	0.05	0.025
Level of significance for a two-tailed test	0.10	0.05
N = 16	0.429	0.503
17	0.414	0.485
18	0.401	0.472
19	0.391	0.460
20	0.380	0.447

The calculated value of rho must be greater than or equal to the critical value to be significant.

2 1

Identify the appropriate critical value from **Table 1**. Explain your choice.

[4 marks]

The critical value is 0.401.

The researcher's hypothesis predicted a positive correlation, so it is directional and a one-tailed test is used, giving the column with 0.05 for a one-tailed test.

The level of significance chosen was 5%, which is $p \leq 0.05$.

There were 18 participants, so $N = 18$. Reading across from $N = 18$ in the 0.05 one-tailed column gives a critical value of 0.401.

Extra space _____



2 2

Explain whether the researcher's hypothesis should be accepted. Refer to the critical value identified in **Question 21** in your answer.

[2 marks]

The hypothesis should not be accepted (the null hypothesis is retained), because the calculated value of rho (0.395) is less than the critical value (0.401), so the result is not significant at $p \leq 0.05$.

2 3

Explain why the researcher decided to use the 5% level of significance rather than the 1% level in this study.

[2 marks]

5% is the conventional level used by psychologists, as it balances the risk of Type I and Type II errors. The study of hours slept and feeling rested is not a sensitive or health-related topic (unlike a drug trial), so 1% is unnecessary.

When the researcher compared the calculated and critical values of rho, he began to wonder if he might have made a Type II error.

2 4

Explain what is meant by a Type II error in the context of this study.

[2 marks]

A Type II error (false negative) would be if the researcher accepted the null hypothesis, concluding there is no significant correlation between hours slept and how well rested students felt, when in fact there is one.

Turn over for the next question

Turn over ►



2 5

Discuss features of science. Refer to **one or more** examples of psychological research in your answer.

[8 marks]

Science uses the empirical method: knowledge is gained through direct observation and measurement rather than belief. Research should be objective, so the researcher's expectations do not bias results. Milgram's (1963) obedience study achieved this through standardised procedures and an objective measure, the maximum voltage given.

Findings should be replicable, so procedures are recorded in detail and others can check results are consistent; Milgram's study has been replicated in many countries with similar findings. Popper argued theories must be falsifiable. Theory construction and hypothesis testing form a cycle in which hypotheses derived from theories are tested and supported or refuted. Freud's theory is unfalsifiable: if a man denies desiring his mother, this can be interpreted as repression, so Popper called it a pseudoscience.

Kuhn (1962) argued a science has a shared paradigm. A paradigm shift occurs when contradictory evidence builds up, as when behaviourism, dominant from the 1920s, gave way to the cognitive revolution in the 1970s. Kuhn saw psychology as a pre-science, with many conflicting approaches, such as the biological, behaviourist and psychodynamic, rather than one agreed paradigm.

However, psychology's subject matter makes objectivity difficult: participants respond to demand characteristics, and controlled lab studies may lack ecological validity. Humanism rejects the scientific method altogether, arguing that subjective experience can only be studied idiographically. Even so, scientific methods give psychology credibility and reliable knowledge that can be applied, e.g. in evidence-based therapies.



END OF QUESTIONS

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