

Please write clearly in block capitals.

Centre number

--	--	--	--	--

Candidate number

--	--	--	--

Surname *StemUp Model Solution*

Forename(s)

Candidate signature

I declare this is my own work.

INTERNATIONAL A-LEVEL PSYCHOLOGY

Unit 3 Advanced Topics and Research Methods 2

Monday 9 January 2023 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: Psychology of Sleep

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

0	1
---	---

One type of biological rhythm is a circadian rhythm. An example of a circadian rhythm is the sleep/wake cycle.

Identify **two other** types of biological rhythms and give an example of **each** type.

[4 marks]

Ultradian rhythm: a rhythm with a cycle of less than 24 hours.

Example: the stages of sleep, where we move through the cycle of NREM stages 1 to 4 and REM sleep about every 90 minutes during the night.

Infradian rhythm: a rhythm with a cycle of more than 24 hours.

Example: the human menstrual cycle, which lasts about 28 days

(another example is seasonal affective disorder, a circannual rhythm).

Ying is taking part in an experiment into the nature of sleep. Electrodes are connected to his head to record the electrical activity of his brain when he is asleep. The electrical activity of Ying's brain speeds up and becomes irregular 80 minutes after he has fallen asleep.

0	2	.	1
---	---	---	---

Identify the type of sleep Ying enters 80 minutes after he falls asleep. With reference to the experiment above, explain how you know Ying has entered this type of sleep.

[2 marks]

Rapid eye movement (REM) sleep. Ying's brain activity has sped up and become irregular, ie desynchronised, which is characteristic of REM sleep, and he entered it after 80 minutes, which fits as people typically enter REM sleep about 75 minutes after falling asleep.



0 2 . 2

Identify **three other** characteristics of the type of sleep you identified in your answer to Question **02.1**.

[3 marks]

1. Loss of body muscle tone, ie the major muscles are paralysed.
2. Rapid movement of the eyes under the eyelids.
3. It is associated with dreaming; also heart rate and blood pressure increase.

0 3

Describe and evaluate research into memory consolidation as a function of sleep.

[9 marks]

Memory consolidation theory proposes that sleep allows newly acquired, fragile memories to be stabilised and strengthened into long-term memory, when the brain is not taking in new information. Karni et al. (1994) selectively disrupted participants' REM and NREM sleep after they learned a visual discrimination task. Performance improved overnight when NREM sleep was disrupted but not when REM sleep was disrupted, showing that consolidation of this skill depended on REM sleep but not NREM sleep.

Walker et al. (2002) found that a motor learning (finger tapping) task improved if it was followed immediately by sleep, and there was a significant positive correlation between the amount of improvement and the amount of stage 2 NREM sleep. Diekelmann and Born (2010) reviewed the research and concluded that REM sleep plays a role in the consolidation of procedural memory, whereas NREM sleep helps the consolidation of declarative memory: during slow wave sleep declarative memories are reactivated and redistributed from the hippocampus to the frontal cortex for long-term storage.

Turn over ►



The research is reliable, as there is a substantial body of evidence from different researchers and different tasks supporting the role of sleep in memory consolidation. Advances in techniques used to measure brain activity, such as EEG and brain scanning, have helped us to understand which stages of sleep are involved, and the studies are carried out under controlled laboratory conditions, which increases internal validity.

However, methods used to measure brain activity still lack precision, so they do not give us a full, detailed understanding of what happens in the brain. The role of sleep in memory consolidation is highly complex, and the processes involved are still not fully understood, eg findings differ over whether REM or NREM is more important for some tasks. In early studies there was also the extraneous variable that it was difficult to distinguish between the role of sleep itself and simply being quiet and undisturbed, with less interference from new information. Selective sleep deprivation may also cause stress, which could itself impair performance, an alternative explanation.

Overall, the research strongly suggests sleep aids memory consolidation, but the exact mechanisms are still unclear.

Extra space



0 4

Discuss the effects of shift work on biological rhythms.

[12 marks]

Shift work involves working patterns where people work at times when they would normally be sleeping, such as night shifts or rotating shifts.

This leads to desynchronisation of the endogenous pacemakers (internal body clocks, such as the suprachiasmatic nucleus) with exogenous zeitgebers (environmental cues such as light and social cues). Shift workers try to sleep during the day when it is light and noisy and their body temperature is rising, and stay awake at night when their circadian rhythm is at its low point.

As a result, there are many effects. Shift workers often suffer sleep deprivation and fatigue because their daytime sleep is shorter and interrupted. They show poor performance, attention and judgement during night shifts, especially in the early hours of the morning, which increases the risk of accidents. Long-term, shift work is associated with an increased risk of cancer, heart disease and depression, as well as

Turn over ►

digestive problems.

There is supporting evidence. Davis et al. (2001) found that women who worked night shifts had a higher risk of breast cancer, possibly because exposure to light at night suppresses melatonin. Coren (1996) showed that even losing one hour of sleep when the clocks change in spring leads to an increase in accidents, suggesting that the larger disruption of shift work is dangerous. Major disasters such as Chernobyl and Three Mile Island occurred during night shifts, linking shift work to impaired judgement. However, much of this evidence is correlational, so other factors, such as lifestyle, stress or social disruption, may explain the health effects rather than the disruption of biological rhythms itself. Research has led to techniques to help people cope with the effects of shift work. Czeisler, Moore-Ede and Coleman (1982) studied workers at a chemical plant who rotated shifts backwards every week. When the shifts were changed to forward rotation (phase delay) and changed every three weeks rather than every week, workers reported better health, higher morale and productivity increased. This is because it is easier for the body clock to adjust forwards, like flying west. Gordon et al. (1986) found that police officers on forward-rotating shifts had fewer sleeping problems, fewer accidents and less stress.

Other techniques include non-rotating shift work, where people always work nights so their rhythms can adjust, although they usually revert to normal patterns on days off, and rapid rotation, where shifts change every two to three days so that the rhythms remain adjusted to the normal day. Phillips et al. (1991) and others have explored these schedules, and bright light exposure and darkened bedrooms can also



help to reset the body clock. This research therefore has practical applications that can improve workers' health and safety and benefit employers.

However, there are individual differences in the effects of shift work.

Some people, such as 'owls' (evening types) and younger workers, suffer much less than 'larks' and older workers, and some people's rhythms adjust faster than others. This means findings from particular samples, such as factory workers or police officers, may not generalise to all shift workers. Many studies also rely on self-report measures of sleep and health, which may be affected by social desirability bias.

In conclusion, shift work clearly disrupts biological rhythms and is linked to fatigue, poor performance and health problems, but its effects can be reduced by well-designed shift schedules, and individual differences mean that not everyone is affected equally.

Extra space



Section B: Schizophrenia

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

Erika hears voices in her head. She believes the voices are the thoughts of other people. When in conversation with other people, Erika rarely responds. She wants to go to college to study but often sits at home doing nothing all day.

0	5
---	---

Identify an example of each of the following symptoms of schizophrenia shown by Erika.

[4 marks]

Avolition Sits at home doing nothing all day.

Delusion Believes the voices are the thoughts of others.

Hallucination Hears voices in her head.

Speech poverty Rarely responds in conversation.

0	6
---	---

Explain **one** strength and **one** limitation of cognitive therapy as a therapy for schizophrenia.

[3 marks + 3 marks]

Strength: there is supporting evidence for its effectiveness. Drury et al.
(1996) found that patients receiving cognitive therapy alongside
medication had a greater reduction in positive symptoms and faster
recovery than a control group. Also, it has no side effects, unlike
antipsychotic drugs, which decreases drop-out rates, and helping to treat
delusional thinking can increase adherence to the drug regime.

Limitation: cognitive therapy requires self-awareness and a willingness to
engage with the process, which some people with schizophrenia lack, eg
those with negative symptoms such as avolition or those in a severe
psychotic episode. It also requires a course of sessions, so these patients
may drop out, which means it is not effective for all patients with
schizophrenia.



0 7

Describe and evaluate **two** biological explanations for schizophrenia.**[20 marks]**

The genetic explanation suggests that schizophrenia is hereditary and runs in families. Family, twin and adoption studies confirm that schizophrenia clusters in families: the closer the genetic relationship to someone with schizophrenia, the higher the risk. Identical (MZ) twins, who share 100% of their genes, have a higher concordance rate than non-identical (DZ) twins, who share about 50%, and adopted children have a higher incidence if one or more of their biological parents has schizophrenia. Schizophrenia is thought to be polygenic: many candidate genes each increase the risk slightly, including genes coding for neurotransmitters such as dopamine.

The second explanation is neural correlates, ie patterns of brain structure or activity associated with schizophrenia. The dopamine hypothesis states that increased dopamine activity in subcortical areas, such as the mesolimbic pathway, is responsible for positive symptoms such as hallucinations, while reduced dopamine in the frontal areas of the brain may cause negative symptoms. The glutamate hypothesis states that glutamate activity is reduced in people with schizophrenia, linked to NMDA receptors working less effectively; as glutamate acts to reduce dopamine, reduced glutamate increases dopamine and so results in symptoms. Brain structure and activity also correlate with symptoms: there is a negative correlation between activity in the ventral striatum and the severity of negative symptoms (Juckel et al., 2006), and reduced activity in the superior temporal gyrus and anterior cingulate gyrus is a neural correlate of positive symptoms such as auditory hallucinations.

Turn over ►

There is strong supporting evidence for the genetic explanation.

Gottesman and Shields (1966) found a much higher concordance rate for MZ twins than DZ twins. Kety et al. (1968) and Tienari et al. (1994) found that adopted children whose biological mothers had schizophrenia were more likely to develop it than controls, even though they were raised by other families, which separates genes from upbringing. Ripke et al. (2014) compared the genomes of over 37,000 people with schizophrenia with controls and identified 108 genetic variations associated with increased risk, supporting the polygenic view.

However, there are issues with this research. Twin studies often use small samples, and MZ twins are treated more similarly and reared in a more similar environment than DZ twins, so nurture might partly explain their higher concordance rate. As concordance for MZ twins is not 100%, genes cannot be the whole explanation; a diathesis-stress model, where a genetic vulnerability is triggered by environmental stressors such as trauma or cannabis use, may be more appropriate.

There is supporting evidence for the dopamine hypothesis from the success of antipsychotic drugs, which block dopamine receptors and help to reduce symptoms, and amphetamines, which increase dopamine, can produce schizophrenia-like symptoms. Kim et al. (1980) found low glutamate levels in the spinal fluid of people with schizophrenia, supporting the glutamate hypothesis. However, the dopamine hypothesis is an oversimplification, as many neurotransmitter systems, including glutamate and serotonin, interact, and the mapping of these cortical pathways needs further investigation. Atypical antipsychotics that also act on serotonin are effective, suggesting dopamine is not the only



cause.

Findings on brain structure are also unreliable. Lewis (1990) reviewed 18 studies and found no significant link between enlarged ventricles and the negative symptoms of schizophrenia. A variety of brain mechanisms seem to be implicated, but none are yet sufficiently understood to provide a causal link. As the research is correlational, it is unclear whether brain differences cause schizophrenia or are a consequence of the disorder or of long-term antipsychotic medication.

Both explanations are reductionist, as they reduce a complex disorder to biological factors. Environmental risk factors, such as urban living, childhood trauma, family dysfunction and cannabis use, are implicated in the onset of schizophrenia, so it is likely that biological factors only partially contribute to its development. Nonetheless, biological

Extra space explanations are scientific and have led to effective drug treatments that have helped many patients.

In conclusion, there is strong evidence that genes and neural correlates both contribute to schizophrenia, but neither provides a complete causal account, so an interactionist approach is best.



Section C: Research Methods 2Answer **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.



Previous research has found that students who study languages are better at solving verbal problems than numerical problems. A researcher decided to investigate this further and conducted an experiment using a sample of 10 language students. The language students were asked to solve two different types of problem in controlled conditions.

In condition 1, 10 language students were invited to a university and were asked to solve five verbal problems correctly. The researcher recorded the time taken to solve the problems correctly.

In condition 2, the same 10 participants were invited back to the university a week later. This time they were asked to solve five numerical problems correctly. Again, the researcher recorded the time taken to solve the problems correctly.

0 8

Briefly outline what is meant by an aim.

[1 mark]

A general statement describing the purpose of the study, ie what the study intends to investigate.

0 9

Identify the aim of this study.

[1 mark]

To investigate problem-solving skills in language students, ie whether they solve verbal problems more quickly than numerical problems.



1 0

Briefly outline what is meant by a hypothesis.

[1 mark]

A testable statement which predicts what will happen in an investigation.

1 1

Write an appropriate hypothesis for this study.

[3 marks]

Language students will take significantly less time (in seconds) to correctly solve five verbal problems than the time they take to correctly solve five numerical problems.

1 2

Identify the type of experimental method used in this study. Explain your answer.

[2 marks]

Laboratory experiment. The experiment was carried out in a controlled environment (at a university), where the researcher manipulated the IV, the type of problem, and recorded the time taken to solve them under controlled conditions.

Turn over for the next question**Turn over ►**

1 3

Explain **one** strength of the type of experimental method you identified in your answer to Question 12.

[3 marks]

A laboratory experiment has a high level of control over extraneous variables, eg all the language students solved the problems in the same controlled conditions at the university. This means the researcher can be more confident that the type of problem (IV) caused the difference in time taken (DV), so cause and effect can be established, and the standardised procedure makes it easy to replicate to check reliability.

The results for the 10 participants are shown in **Table 1** below.

Table 1 – Time taken to solve verbal and numerical problems

Participant	Condition 1 – Time taken to solve 5 verbal problems (seconds)	Condition 2 – Time taken to solve 5 numerical problems (seconds)
1	134	167
2	123	235
3	68	109
4	134	178
5	230	209
6	102	198
7	269	358
8	134	103
9	74	289
10	102	234

1 4

Use the data in **Table 1** to calculate the mean time taken to solve the problems for **each** condition. Show your workings.

[4 marks]

Condition 1: $(134 + 123 + 68 + 134 + 230 + 102 + 269 + 134 + 74 + 102) \div 10 = 1370 \div 10$

Mean = 137 seconds

Condition 2: $(167 + 235 + 109 + 178 + 209 + 198 + 358 + 103 +$



$$289 + 234) \div 10 = 2080 \div 10$$

$$\text{Mean} = 208 \text{ seconds}$$

1 5

Which of the following ways of presenting data would be the most appropriate way of displaying the means for each condition? Shade **one** box.

[1 mark]

A Bar chart

☒

B Histogram

☐

C Line graph

☐

D Scattergram

☐

1 6

Identify an appropriate statistical test which could be used to analyse the results of this study. Give **three** reasons why the test you have chosen would be suitable in this case.

[4 marks]

Related t-test.

1. The data is interval, as time taken in seconds is measured on a numerical scale of equal intervals.

2. The design is repeated measures, as the same 10 participants took part in both conditions.

3. The researcher is looking for a difference in the time taken to solve the verbal and the numerical problems.

Turn over for the next question

Turn over ►



The researcher identified a possible problem with demand characteristics in the study.

1 7

Briefly outline what is meant by demand characteristics.

[1 mark]

A cue from the researcher or the research situation which may be interpreted by the participant as revealing the aim of the investigation, so they change their behaviour.

1 8

Explain how demand characteristics could have affected the validity of this study.

[3 marks]

As this was a repeated measures design, the participants did both conditions, so they would have been aware of the two types of problems, verbal and numerical. As they were language students, they may have guessed the aim and assumed they should be quicker at verbal problems, so they may have unconsciously tried harder in condition 1. Faster verbal times may then be due to demand characteristics rather than their linguistic ability, acting as a confounding variable and lowering internal validity.

1 9

Briefly explain **one** way that the researcher could have reduced the chances of demand characteristics in this study.

[2 marks]

The researcher could use an independent groups design, with different language students in each condition, so each participant only solves one type of problem and is only aware of the condition they took part in, making it harder to guess the aim.



In a follow-up study, the researcher asked the original participants to keep a daily problem-solving diary for one week. In the diary, they were asked to record details of any problems they had solved during their studies.

2	0
---	---

Explain how the researcher could use content analysis to analyse the problem-solving diaries.

[4 marks]

The researcher would first read a sample of the diaries and develop a coding system of behavioural categories to categorise and quantify the content, eg the number of verbal problems solved each day, the number of numerical problems solved each day.

The researcher would then work through all the diaries and tally every instance of each category, producing quantitative data that could be compared, eg verbal versus numerical problems. Once coded, a thematic analysis could also identify recurrent themes.

30

END OF QUESTIONS



There are no questions printed on this page

*Do not write
outside the
box*

**DO NOT WRITE ON THIS PAGE
ANSWER IN THE SPACES PROVIDED**



