Surname	StemUp Model Solution	Centre Number	Candidate Number
First name(s)			2

GCE A LEVEL

S24-1290U40-1

1290U40-1

MONDAY, 3 JUNE 2024 – AFTERNOON

PSYCHOLOGY – A2 unit 4
Applied Research Methods

1 hour 30 minutes

For Examiner's use only		
Question	**Maximum Mark**	**Mark Awarded**
1.	**16**	
2.	**14**	
3.	**12**	
4.	**18**	
Total	**60**	

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ADDITIONAL MATERIALS

You may require a calculator and a ruler.

INSTRUCTIONS TO CANDIDATES

Use black ink or black ball-point pen. Do not use gel pen or correction fluid.

You may use a pencil for graphs and diagrams only.

Write your name, centre number and candidate number in the spaces at the top of this page.

Answer **all** questions.

Write your answers in the spaces provided in this booklet. If further space is required for any question, you should use the additional page(s) at the back of the booklet, taking care to number the question(s) correctly.

INFORMATION FOR CANDIDATES

The number of marks is given in brackets at the end of each question or part-question.

You are reminded of the necessity for good English and orderly presentation in your answers.

Assessment will take into account the quality of written communication used in your answers.

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SECTION A – Personal Investigations

You should answer **all** the questions in this section with reference to the personal investigations carried out in your study of psychology.

INVESTIGATION ONE:

An experiment on a context dependent memory task.

1. (a) (i) Identify the experimental design used in your experiment. [1]

Independent groups design.

(ii) Justify why the experimental design identified in (a)(i) was appropriate in your experiment. [2]

I chose independent groups so that each participant only learnt the list of 20 words once and was tested in one room only. With repeated measures they would have seen a second list in a second room, could have guessed the aim (context dependent memory) and shown demand characteristics or practice effects, lowering the internal validity of my recall scores.

(b) State the null hypothesis of your experiment. [2]

There will be no difference in the number of words correctly recalled, out of 20, between participants tested in the same classroom in which they learnt the list and participants tested in a different room (the sports hall); any difference will be due to chance.

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(c) (i) Identify the location of research used in your experiment. [1]

Field (a field experiment in the sixth form classrooms of my school).

(ii) Justify why the location of research identified in (c)(i) was appropriate for your experiment. [2]

The participants were sixth form students learning and recalling the word list in their normal classrooms, which is the usual environment where they learn and are tested. This made their recall behaviour more natural, increasing the ecological validity of the experiment, whilst I could still control the IV (same room v different room).

(d) Evaluate the descriptive statistics used to analyse the data in your experiment. [4]

I used the mean as my measure of central tendency (same room = 14.2, different room = 10.6 words). A strength is that it is the most sensitive measure because every recall score is included in the calculation. A weakness is that it can be distorted by outliers: one participant in the different room condition recalled only 3 words, which pulled that mean down, so the median (11) may have been more representative.

I used the range as my measure of dispersion. It was quick and easy to calculate compared to the standard deviation, but it only uses the highest and lowest scores, so it is distorted by that outlier and does not show how the scores were spread around the mean. The standard deviation would have been more sensitive as it takes all scores into account.

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(e) Explain **one** issue of validity you considered for your experiment and **one** way you dealt with it. [4]

One issue of validity was participant variables. Because I used independent groups, the two groups were different people, so if the same room group happened to have better memories than the different room group, their higher recall scores would be due to individual differences in memory ability rather than the context. This would lower the internal validity, as I could not be sure the IV (room) caused the change in the DV (words recalled).

To deal with this I randomly allocated participants to the conditions: I put the names of the 20 students into a hat and the first 10 drawn were tested in the same classroom and the remaining 10 in the sports hall. This meant that good and poor memorisers had an equal chance of being in either condition, so participant variables should be spread evenly across both groups.

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INVESTIGATION TWO:

A non-participant observation of mobile phone use.

2. (a) With reference to the observational sampling technique used, explain how you collected data for your non-participant observation. [4]

I used event sampling to collect the data. First I made a behavioural checklist with operationalised categories of mobile phone use: texting/messaging, making or receiving a call, scrolling social media, taking a photo/selfie and listening to music with headphones. I sat in the school canteen at lunchtime as a covert non-participant observer for 30 minutes. Each time a student displayed one of the behaviours on the checklist I put a tally in that category, separately for males and females. At the end I added up the tallies for each behaviour, which showed me which use of the mobile phone was the most frequent.

(b) Explain how you could assess the reliability of your non-participant observation. [2]

I could assess inter-rater reliability by having a second observer watch the same students in the canteen at the same time, using the same standardised behavioural checklist. We would tally independently and then correlate our tallies for each category; a correlation of +0.8 or more (80% agreement) would show the observation was reliable.

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(c) State **two** findings from the descriptive statistics used in your non-participant observation. [2]

16 out of 25 females observed (64%) were seen texting/messaging on their mobile phone.

The mode for males was scrolling social media, with 14 tallies, compared to 3 tallies for making a phone call.

(d) Discuss why **two** changes to your non-participant observation would improve the investigation. [3+3]

Change 1: I used an opportunity sample of students in one school canteen, so the findings only represent 16 to 18 year olds in one school. I would observe in several public locations (e.g. a town centre, a café and a train station) at different times of day. This would give a more varied and representative sample of ages and backgrounds, increasing population validity, so the findings about mobile phone use could be generalised to the wider population and not just to sixth formers at lunchtime.

Change 2: I was the only observer, and some categories overlapped (e.g. a student scrolling social media while listening to music), so my tallies may have been subjective. I would clearly operationalise each behaviour with a definition and add a second trained observer, checking inter-rater reliability in a pilot study. This would reduce observer bias and increase the reliability of the tallies, and because behaviours are coded consistently, it would also increase internal validity, as I would be measuring what I intended to measure.

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SECTION B – Application of research methods to novel scenarios

Answer **all** questions.

3. A positive psychologist conducted a longitudinal study to investigate the effects that social media has upon mental wellbeing. Using a volunteer sample of 10 male and 10 female participants, she assessed their frequency of use of social media and their happiness at the age of 15 years, then at 21 years and then again at 26 years. To assess happiness, the psychologist used a 5-point Likert scale, ranging from 1 – 5, where 1 is very unhappy and 5 is very happy. The psychologist calculated the descriptive statistics using measures of central tendency. The results are shown in **Figure 1** below.

Figure 1. Mean, Median and Modal happiness scores at ages 15, 21 and 26 years.

Age	Mean happiness score	Median happiness score	Mode happiness score
15 years	3.5	3	2
21 years	3	3	3
26 years	4.5	4	5

(a) Define 'ordinal' data. [2]

Ordinal data is a level of measurement where the data can be placed in rank order (ascending or descending, e.g. happiness scores of 1 to 5 on the Likert scale), but the intervals between the points are not necessarily equal.

(b) Explain how the psychologist could have gained her sample using self-selected sampling. [2]

She could have put up posters in high schools in the area describing the longitudinal study on social media and happiness, asking 15 year olds to contact her if they wanted to take part. The first 10 males and 10 females who volunteered made up the sample.

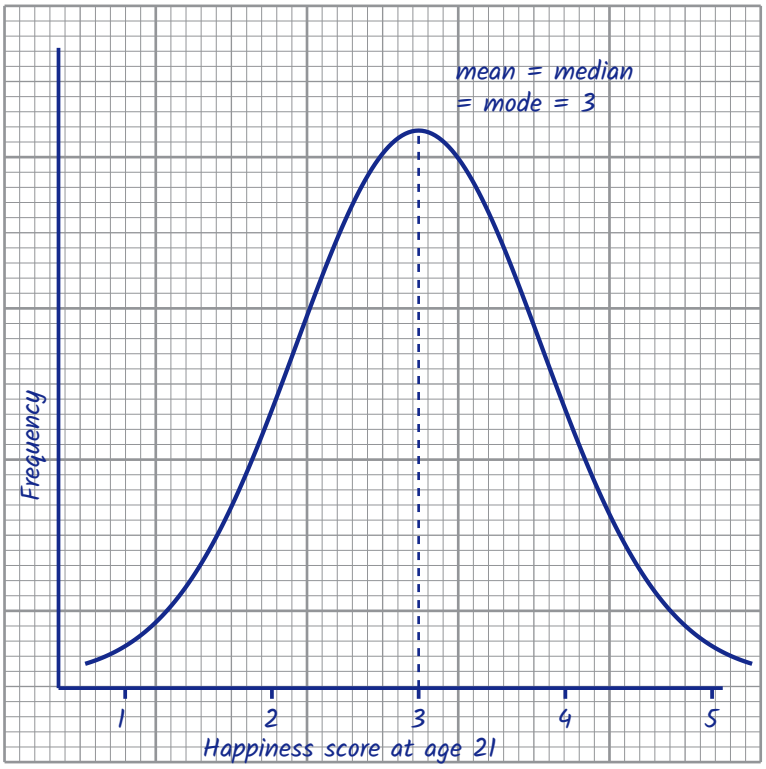
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(c) (i) Sketch a distribution curve for the scores attained by the participants at age 21 years. [1]



(ii) Identify the type of distribution curve you sketched in **3**(c)(i). [1]

Normal distribution curve.

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(iii) Explain why the distribution curve you drew in (c)(i) represents the data for the participants at age 21. [2]

At age 21 the mean (3), the median (3) and the mode (3) happiness scores were all exactly the same, so they all fall at the same central point of the curve. The curve is therefore symmetrical about 3, with the scores spread evenly either side.

(d) Evaluate **one** strength and **one** weakness of longitudinal research. [2+2]

Strength: the same 20 participants are tested at 15, 21 and 26, so participant variables are controlled, and developmental trends can be seen, e.g. happiness falling from a mean of 3.5 to 3 then rising to 4.5 can be linked to changes in social media use.

Weakness: because it takes 11 years there is likely to be attrition, as some participants drop out or move away. The remaining sample becomes smaller and may be biased (e.g. only the happiest stay), lowering population validity.

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4. A researcher conducted a correlational study to investigate the relationship between sleep and exercise. He used an opportunity sample of friends and family. He asked the participants to estimate how much sleep they got per night and to estimate how many hours per week they spent exercising. The data was plotted on a scatter diagram.

(a) Justify the choice of a scatter diagram to graphically represent the data in this research. [2]

A scatter diagram is used because the researcher is looking for a correlation (relationship) between two co-variables: estimated hours of sleep per night and estimated hours of exercise per week. It shows the direction and strength of the relationship.

(b) Apart from it being a correlational study, fully explain **one** other reason why a Spearman's rank order correlation coefficient is appropriate in this research. [2]

The data is related, as each participant provides a pair of scores (their own hours of sleep and their own hours of exercise), and Spearman's is used for paired data that is at least ordinal (time in hours is ratio data, so it can be ranked).

(c) Explain **one** ethical issue in this research and **one** way of dealing with this issue. [2+2]

One issue is risk of psychological harm (embarrassment): friends and family may feel humiliated about how little exercise or sleep they get, especially as the researcher knows them personally.

To deal with this, the researcher should give each participant a number instead of their name, keep the sleep and exercise data confidential, remind them of their right to withdraw, and fully debrief them at the end.

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The researcher wanted to further investigate the effect that exercise has upon sleep by conducting an experiment. His experimental hypothesis was 'the number of hours sleep per night will increase after exercising for one hour per day'. The researcher used a self-selected sample of 10 participants. During the first week, the participants did not exercise. During the second week, the participants exercised for an hour each day. In both weeks, the participants were required to wear a sleep monitoring device each night so that their length of sleep could be recorded.

(d) Discuss **one** reason the researcher may have wanted to study sleep and exercise using an experiment. [2]

An experiment allows the researcher to manipulate the IV (exercising for one hour a day or not) and measure its effect on the DV (hours of sleep), so cause and effect can be established, which a correlation cannot show. The sleep monitor also controls extraneous variables, as sleep is measured objectively rather than estimated, increasing internal validity.

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(e) The sleep monitoring devices showed that all 10 participants slept more during the second week. The researcher analysed the data using a Wilcoxon matched pairs signed ranks test, using a 0.05 probability value. The observed (calculated) value of T was 10.

With reference to an appropriate critical value from **Figure 2**, explain which hypothesis the researcher should accept and which hypothesis the researcher should reject. [4]

Figure 2. Critical values for a Wilcoxon T test

N	One-tailed (Directional)	
	0.05	0.025
	Two-tailed (Non-directional)	
	0.10	0.05
8	6	4
9	8	6
10	11	8
11	14	11

The hypothesis is directional (sleep will increase), so a one-tailed test at $p \leq 0.05$ is used. With N = 10 the critical value of T is 11.

The observed value of T = 10 is less than the critical value of 11, and for Wilcoxon the observed value must be equal to or less than the critical value to be significant. Therefore the result is significant at the 0.05 level.

The researcher should accept the experimental hypothesis that 'the number of hours sleep per night will increase after exercising for one hour per day', and reject the null hypothesis that there is no difference in hours of sleep between the week with no exercise and the week of exercise (any difference being due to chance).

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(f) Evaluate **two** weaknesses of using experiments in research. [2+2]

Weakness 1: experiments often have low ecological validity. In a controlled study, participants exercise for a set hour each day and wear a sleep monitor, which is not how they would normally behave. The setting and task are artificial, so the results may not generalise to real life sleep and exercise patterns.

Weakness 2: participants may respond to demand characteristics. As they know they are exercising one week and not the other, they may guess the aim and change their behaviour, e.g. going to bed earlier in the exercise week to please the researcher. This means the change in the DV may not be caused by the IV, which threatens internal validity.

END OF PAPER

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