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

GCE A LEVEL

A290U20-1

S23-A290U20-1

THURSDAY, 25 MAY 2023 – AFTERNOON

PSYCHOLOGY – A level component 2
Psychology: Investigating Behaviour

2 hours 15 minutes

For Examiner's use only		
Question	**Maximum Mark**	**Mark Awarded**
1.	**3**	
2.	**7**	
3.	**7**	
4.	**4**	
5.	**4**	
6.	**4**	
7.	**5**	
8.	**12**	
9.	**16**	
10.	**14**	
11.	**11**	
12.	**13**	
Total	**100**	

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ADDITIONAL MATERIALS

In addition to this paper 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. Additional space is provided for some questions within the booklet (if required). 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 – Principles of Research

Answer **all** questions.

1. Identify which type of variable is being described in the following statements:

(a) Variables in a study that are not being measured or manipulated by the researcher but affect the results of all participants' behaviour equally. [1]

Extraneous variables (affecting all participants equally).

(b) Variables in a study that are not being measured or manipulated by the researcher, that affect some participants' behaviour but not others. [1]

Confounding variables.

(c) The variable the psychologist manipulates and controls to see how it affects behaviour. [1]

The independent variable (IV).

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2. (a) Explain what is meant by the term 'significance level'. [2]

The significance level is the probability that the results (the difference or correlation found) are due to chance rather than the IV. It is set before the study, usually at $p \leq 0.05$, and is the cut-off used to decide whether to reject the null hypothesis, so it shows the margin of error accepted.

(b) Explain what is meant by '$p \leq 0.01$'. [2]

$p \leq 0.01$ means the probability that the results are due to chance is 1% (1 in 100) or less, so we can be at least 99% confident that the difference or correlation is real and not down to chance.

(c) Explain why a psychological researcher might use a p value of $p \leq 0.01$ rather than $p \leq 0.05$. [2]

$p \leq 0.01$ is a stricter, more stringent level than $p \leq 0.05$, so it reduces the risk of a Type 1 error (wrongly rejecting the null hypothesis). This matters where a mistake would be serious, e.g. clinical drug trials, or when replicating a controversial finding.

(d) Explain the difference between the meaning of the symbol ≤ and <. [1]

≤ means 'less than or equal to', whereas < means only 'less than' (the value cannot be equal).

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3. (a) Briefly explain how a psychologist would select a random sample for research. [2]

The psychologist lists the names of everyone in the target population (e.g. a school register) and then selects the required number using a random system, such as a computer-generated random number list or drawing names from a hat, so every person has an equal chance of being chosen.

(b) Evaluate the use of random sampling in psychological research. [5]

A strength of random sampling is that it is free from researcher bias: the researcher does not choose who takes part, so they cannot select people likely to support the hypothesis. Because every member of the target population has an equal chance of selection, the sample is more likely to be representative, so findings can be generalised with more confidence, increasing population validity.

However, it can be difficult and time consuming. The researcher needs access to a full and accurate list of the target population, which may not exist or may be confidential (e.g. all the people with a phobia in a city). Also, the randomly selected people may refuse to take part or drop out, so the researcher has to start again and the final sample becomes partly self-selected, losing the benefit of randomness.

Finally, random selection does not guarantee representativeness: by chance, especially in a small sample, one group (e.g. mostly girls) may be over-represented. A stratified sample might then be better.

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4. Explain the following ways of assessing reliability in psychological research:

(a) 'Test-retest reliability'. [2]

The same test is given to the same participants on two occasions, some time apart (e.g. two weeks), under the same conditions, and the two sets of scores are correlated. A strong positive correlation (+0.8 or above) shows the test has external reliability.

(b) 'Split-half reliability'. [2]

A participant's test items are split into two halves (e.g. odd and even questions) and the scores on each half are compared and correlated. If the participant gets the same or similar scores on both halves, the test is consistent within itself, showing high internal reliability.

5. Explain **two** advantages of conducting psychological research in the field compared to a laboratory environment. [2 + 2]

1. Research in the field has higher ecological validity than a laboratory, because participants are in their natural environment (e.g. a school or shop) doing everyday tasks, so they behave more naturally than in an artificial, controlled lab setting, and findings generalise better to real life.

2. There is less risk of demand characteristics in the field. In a lab, participants know they are being studied and may guess the aim and change their behaviour, whereas in the field they are often unaware of the study, so their behaviour is more genuine and validity is higher.

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6. Briefly explain the process of peer review in psychological research. [4]

When a researcher finishes a study, they write a report and submit it to the editor of a journal, who sends it to a panel of peers: independent experts in the same field, usually anonymous. The reviewers scrutinise the report, e.g. whether the methodology is valid, the data analysis and statistics are correct and the conclusions are supported by the findings, and send their comments to the editor. The editor then either accepts it, rejects it, or returns it to the author to make revisions. The revised article is re-submitted to the editor and, if it is now acceptable, published.

7. Discuss the benefits of using quantitative data compared to qualitative data in psychological research. [5]

Quantitative data is numerical, so it is easier and quicker to analyse than qualitative data: descriptive statistics and inferential tests can be used to check objectively whether a difference is significant, whereas analysing detailed qualitative data, such as interview transcripts, through thematic analysis is time consuming and open to researcher bias in interpretation. Quantitative data is also more objective and easier to compare between groups and to replicate, so it is more reliable and more scientific.

However, qualitative data may provide more insight into the reasons behind behaviour, so it can be more valid: quantitative data only tells us what is happening (e.g. how many people helped) and not why. So quantitative data is better when the aim is to test a hypothesis reliably, but it may lack depth, and the best research often uses both.

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8. Evaluate methodological and ethical issues that may arise in developmental psychological research, such as Kohlberg's (1968) research *'The child as a moral philosopher'*. [12]

Kohlberg used structured interviews based on hypothetical moral dilemmas, such as Heinz stealing a drug for his dying wife, with 75 American boys aged 10 to 16, who were re-interviewed every three years for 12 years (a longitudinal design), plus cross-cultural comparisons, e.g. in Taiwan, Mexico and Turkey.

Interviews allowed Kohlberg to ask supplementary questions to probe the reasoning behind each answer, which is useful with children, who may be less able to complete written self-reports. However, children are more susceptible to researcher bias and social desirability, giving the answer they think the adult wants, and Kohlberg had to interpret their reasoning to score it into stages, which is subjective and lowers validity.

Hypothetical dilemmas investigate what children say they would do, not what they actually would do, so moral reasoning may not match moral behaviour, lowering ecological validity. The scenarios may also not be relevant to a child's life: can a 10-year-old relate to a man whose wife is dying? Studying children of different ages may also not be reliable, as the same dilemmas or questions may not be appropriate for all ages.

The longitudinal method allowed Kohlberg to track the development of the same boys over time, controlling participant variables, but it is more likely to suffer from sample attrition, so the remaining boys may be unrepresentative. The all-male American sample means the stages may not generalise to females; Gilligan argued they are gender biased towards justice reasoning.

Cross-cultural comparison let Kohlberg ask whether moral development is universal or culturally specific, but the same dilemmas and questions, devised in the USA, may not be appropriate for other cultures, e.g. the Heinz story had to be

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changed for Taiwan, so there is a risk of cultural bias.

Ethically, there is a risk of stress or anxiety: dilemmas about death and stealing could upset young children, especially if they felt their answer was 'wrong'.

Children may not understand the debrief offered, so this risk is not alleviated.

There is also a lack of valid consent: under-16s need parental consent, and the boys may not have understood that they were committing to 12 years of interviews, or felt able to refuse an adult researcher.

In conclusion, Kohlberg's methods produced valuable insight into how moral reasoning develops, and the dilemmas were hypothetical, so the risk of harm was probably low. However, the reliance on interpreting what boys said about stories, an all-male sample and culturally specific dilemmas limit the validity and generalisability of his findings, and modern research would need more care with consent and debriefing.

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SECTION B – Personal Investigations

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

INVESTIGATION ONE: A content analysis of anti-social behaviour in the media

9. (a) State the aim of your content analysis. [2]

To investigate whether anti-social behaviour (e.g. vandalism, fighting, loud music at night) is reported differently in UK newspaper articles depending on the gender of the person carrying it out.

(b) Describe the procedures you followed when you carried out your content analysis. [6]

I collected 30 online newspaper articles from three national newspapers (BBC News, The Guardian and the Daily Mail websites) published over one month that reported anti-social behaviour, by searching for terms such as 'anti-social' and 'yobs'. I read through all the articles first to familiarise myself with the content and identify the types of anti-social behaviour mentioned.

From this I created behavioural categories (coding units), e.g. 'verbal abuse', 'vandalism of property', 'physical aggression' and 'noise at night', and wrote a clear definition for each. I then read every article again, looking specifically for content that fitted each category, and made a tally on a coding sheet each time a category appeared, recording separately whether the person was male or female. Finally I totalled the tallies for each category for males and females, turning the qualitative articles into quantitative data, and displayed the frequencies in a bar chart to compare them.

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(c) (i) Explain **one** issue of validity in your content analysis. [2]

One issue was researcher bias in selecting articles: I mainly chose articles from websites I already read, so a full range of media was not sampled and my findings may not truly represent anti-social behaviour across all media, lowering validity.

(ii) Explain how you dealt with the issue of validity identified in (c)(i). [2]

I used a wider range of sources: printed local newspapers as well as national news websites with different political views, and I took every article from set dates rather than choosing them myself. This made my sample more representative and reduced researcher effects.

(d) (i) Explain **one** issue of reliability in your content analysis. [2]

One issue was that my coding unit 'noise' was vague and open to interpretation (e.g. does a car horn count?). This would make it difficult for another researcher to code the articles in the same way as me, reducing the reliability of my findings.

(ii) Explain how you dealt with the issue of reliability identified in (d)(i). [2]

I asked another student and my teacher to check my categories were specific, so I changed 'noise' to 'music played at night' and 'shouting in the street'. We then both coded 10 articles and correlated our tallies, finding high inter-rater reliability.

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INVESTIGATION TWO: A questionnaire on pet ownership and stress

10. (a) Explain how you operationalised 'stress' in your investigation. [2]

I operationalised stress using the Perceived Stress Scale: participants rated 10 items, e.g. 'In the last month, how often have you felt unable to cope?', from 0 (never) to 4 (very often); their total score (0 to 40) was their stress level.

(b) (i) Explain **one** ethical issue which you considered in your investigation. [2]

One ethical issue was protection from harm: questions about stress and pets could upset participants, e.g. someone who had recently lost a pet might feel distressed or anxious when thinking about it.

(ii) Explain how you managed the ethical issue identified in (b)(i). [2]

I told participants beforehand they would be asked about their pets and stress and could withdraw at any time, or skip questions, if they felt upset. At the end I gave them the school counsellor's email.

(iii) Apart from ethical issues, explain **one** strength and **one** weakness of using a questionnaire in this investigation. [2 + 2]

Strength: the questionnaire was anonymous, so participants were more likely to be honest about their stress levels, which they may have been embarrassed to discuss face to face with me, reducing social desirability and increasing the validity of my results.

Weakness: some items were subjective, e.g. 'have you felt overwhelmed?', so pet owners and non-owners may have interpreted 'overwhelmed' differently, meaning their stress scores were not comparable, which reduced the validity of my findings.

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(c) Identify and justify the choice of inferential statistic used to analyse the data in this investigation. [4]

I used a Mann-Whitney U test.

Type of test: I was testing for a difference in stress scores between pet owners and non-pet owners, not a correlation.

Independent data: the two groups were different people (participants either owned a pet or did not), so it was an independent groups design.

Level of measurement: stress was measured as a score on the Perceived Stress Scale, which is ordinal data, because the gaps between ratings such as 'sometimes' and 'often' are not equal, so a non-parametric test was needed.

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SECTION C – Application of research methods to a novel scenario

Answer **all** questions.

11. Psychological research has shown that a memory of an event can be influenced by information received after the event.

Two days after visiting a museum, 40 people went to a laboratory, where they were randomly allocated into one of two groups. Participants in Group A answered questions in a room with a picture of Queen Victoria wearing a white dress and participants in Group B answered questions in a room without any pictures. One question was: "What was the colour of Queen Victoria's dress in the museum?". The correct answer was blue.

Figure 1: Responses to the question "What was the colour of Queen Victoria's dress in the museum?"

	Number of participants who stated this colour	
Response	Group A: room with a picture of Queen Victoria wearing a white dress	Group B: room without any pictures
Blue	6	10
White	11	6
Another colour	3	4
Total	20	20

(a) State **one** appropriate conclusion that can be drawn from the findings in this research (displayed in **Figure 1**). [2]

Post-event information affected recall: more participants correctly said the dress was blue in the room without pictures (10 out of 20) than in the room with the picture of a white dress (6), where 11 wrongly said white.

(b) (i) Identify which measure of central tendency would be appropriate to describe this data (as displayed in **Figure 1**). [1]

The mode.

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(ii) Explain why this is the most appropriate measure of central tendency for this data. [2]

Because the colour of the dress reported (blue, white or another colour) is nominal, category data, so only the most frequent category can be found; a mean or median cannot be calculated.

(iii) Analyse the data in Group B using the measure of central tendency identified in (b)(i). [2]

The mode for Group B is blue, because it was the most commonly occurring answer, given by 10 of the 20 participants (white 6, another colour 4).

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(c) A Chi Square test was carried out and the calculated value was 5.78. The degrees of freedom are 2. Using an appropriate critical value from the table below **(Figure 2)**, justify whether the researcher should accept or reject the null hypothesis. [4]

Figure 2: Critical values for Chi Square test

Degrees of freedom (df)	0.05
1	3.84
2	5.99
3	7.81
4	9.49
5	11.07
6	12.59

The critical value for 2 degrees of freedom at $p \leq 0.05$ is 5.99. The researcher should accept the null hypothesis, because for a Chi Square test the calculated value must be equal to or greater than the critical value to be significant, and the calculated value of 5.78 is lower than 5.99.

So the difference in the colour reported between Group A (picture of a white dress) and Group B (no pictures) is not significant and could be due to chance.

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12. A researcher was asked to report on the effectiveness of a campaign to reduce harmful emissions into the environment. A sample was selected from students aged 13 to 16 years who lived within a safe walking distance of the school and currently travelled by car.

The students were asked to watch the campaign video and then given a questionnaire to measure their attitude towards environmental change. They were then asked to walk to school for a month. The score on the attitude scale and the number of days out of the month in which they walked to school are shown in the table below.

Figure 3: Students' scores on the attitude scale and the number of days they walked to school.

Student	Score on a scale of 1–20 measuring positive attitudes to environmental change	Number of days walked to school out of the 20 school days in the month
1	7	9
2	7	12
3	5	2
4	8	9
5	12	14
6	9	12
7	18	20
8	12	16
9	11	12
10	16	18

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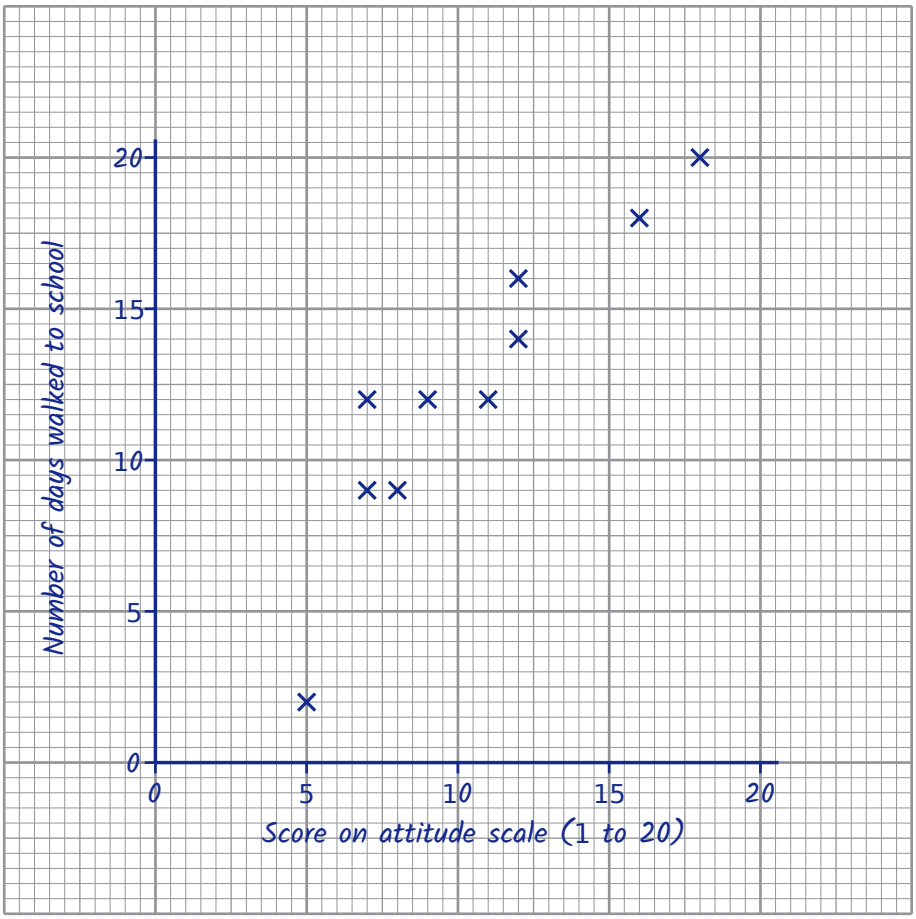
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(a) (i) Identify **one** appropriate graphical representation that could be used to display the data in this research. [1]

A scattergram.

(ii) Using the graphical representation that you identified in (a)(i), display the data in this research. [4]

Scattergram to show the relationship between attitude to environmental change and the number of days walked to school in the month



(b) Identify the level of measurement of the 'scores on the attitude scale' in this research. [1]

Ordinal data.

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(c) (i) Identify **one** appropriate measure of dispersion for the data 'number of days walked to school' in this research. [1]

The standard deviation.

(ii) Justify why the measure of dispersion identified in (c) (i) is appropriate for 'number of days walked to school'. [2]

The number of days walked out of 20 is ratio data, so a precise measure is suitable, and the SD is less distorted by the one extreme low score of 2 (Student 3) than the range, which would be 20 – 2 = 18.

(d) Explain **one** advantage and **one** disadvantage of using a self-selecting sampling technique. [2 + 2]

Advantage: volunteers have chosen to take part, e.g. by replying to an advert, so they are willing and motivated and less likely to drop out than randomly selected participants. Here, students who volunteered would be more likely to keep walking to school for the whole month, reducing attrition.

Disadvantage: the sample is likely to be unrepresentative (volunteer bias), as people who volunteer may be more confident or more interested in the topic than those who do not, e.g. students who already care about the environment, so findings cannot be generalised to all 13 to 16 year olds.

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