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Cambridge Assessment International Education

Cambridge International AS & A Level

CANDIDATE NAME: StemUp Model Solution

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PSYCHOLOGY **9990/21**

Paper 2 Research Methods **May/June 2025**

1 hour 30 minutes

You must answer on the question paper.

No additional materials are needed.

INSTRUCTIONS

- Answer **all** questions.
- Use a black or dark blue pen. You may use an HB pencil for any diagrams or graphs.
- Write your name, centre number and candidate number in the boxes at the top of the page.
- Write your answer to each question in the space provided.
- Do **not** use an erasable pen or correction fluid.
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INFORMATION

- The total mark for this paper is 60.
- The number of marks for each question or part question is shown in brackets [ ].

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Section A

Answer **all** questions.

1 **(a)** Describe what is meant by a questionnaire.

A questionnaire is a self-report method in which participants give written answers to a fixed set of questions (open and/or closed), either on paper or online.

..... [2]

(b) Explain **one** practical strength of using a questionnaire.

A questionnaire can be posted or put online, so a large sample can be reached quickly and cheaply. This means the results are more likely to be representative of the target population and so more generalisable.

..... [2]

2 The study by Bandura et al. (aggression) provides no information about whether or not consent was obtained from the participants.

(a) Outline what is meant by 'consent'.

Consent means the participant (or a parent for a child) agreeing to take part.

..... [1]

(b) Suggest why obtaining consent would have been important in this study.

The children watched a model hit the Bobo doll, so they could learn and imitate aggression that lasted after the study, and could be hurt while playing aggressively. Parents may not have wanted their children to learn aggression.

..... [2]

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3 In the study by Milgram, obedience was tested. Participants with a range of different occupations and ages were used to improve generalisability.

(a) Suggest **one** reason why using participants with different occupations could be important to Milgram's test of obedience. Use an example in your answer.

Obedience may differ between occupations, as some jobs require people to obey orders more than others. For example, a factory worker must obey a supervisor, whereas a manager usually gives orders and expects others to obey.

..... [2]

(b) Suggest **one** reason why using participants with different ages could be important to Milgram's test of obedience. Use an example in your answer.

Obedience may differ with age, as younger people may be more obedient than older people. For example, young people are used to parents and teachers expecting them to obey, whereas older men are more used to giving orders, e.g. to their children.

..... [2]

4 In the study by Baron-Cohen et al. (eyes test), the ages of all participants were known. The mean and standard deviation of the ages of the participants in Groups 1 and 3 are shown in Table 4.1.

Table 4.1

Group	Mean	Standard deviation
Group 1 (AS/HFA adults)	29.7	14.5
Group 3 (Students)	20.8	0.8

(a) State what the means show about the ages of the two groups.

Group 1 (AS/HFA adults) were older on average (29.7 years) than Group 3, the students (20.8 years). ..... [1]

(b) State what the standard deviations show about the ages of the two groups.

The ages in Group 1 were much more spread out (14.5) than in Group 3 (0.8), where the students' ages were all very similar. ..... [1]

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5 Explain **one** ethical weakness of the case study research method. Do **not** use consent in your answer.

Invasion of privacy: one person is studied in great depth, e.g. their history, thoughts and feelings, and the researcher cannot know in advance what will be revealed, so very personal details may come out that the participant wanted to keep private.

..... [2]

6 Describe opportunity sampling and random sampling, using any example(s).

Opportunity sampling uses people who are available at the time and place the study is carried out, e.g. passers-by or students in the researcher's own class who are asked to take part. For example, Piliavin et al. used the passengers who happened to be on the New York subway train, and Baron-Cohen et al. recruited general population adults from an adult community education class in Exeter and a public library in Cambridge.

Random sampling means every member of the target population has an equal chance of being selected. The researcher gets a numbered list of everyone in the target population and draws the number of people needed out of a hat, or uses a random number generator. For example, a researcher could take a list of all 600 students in a school and randomly select 30 of them to be the sample.

..... [6]

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7 Dr Smith wants to compare how easily two species of animal learn to press a lever to receive food.

(a) (i) Suggest **one** way that Dr Smith could produce a quantitative measure of how easily the animals learn.

Put each animal in a Skinner box and time (in seconds) how long it takes until it presses the lever to get food, over several trials. The quicker it presses the lever, the more easily it has learned.

..... [2]

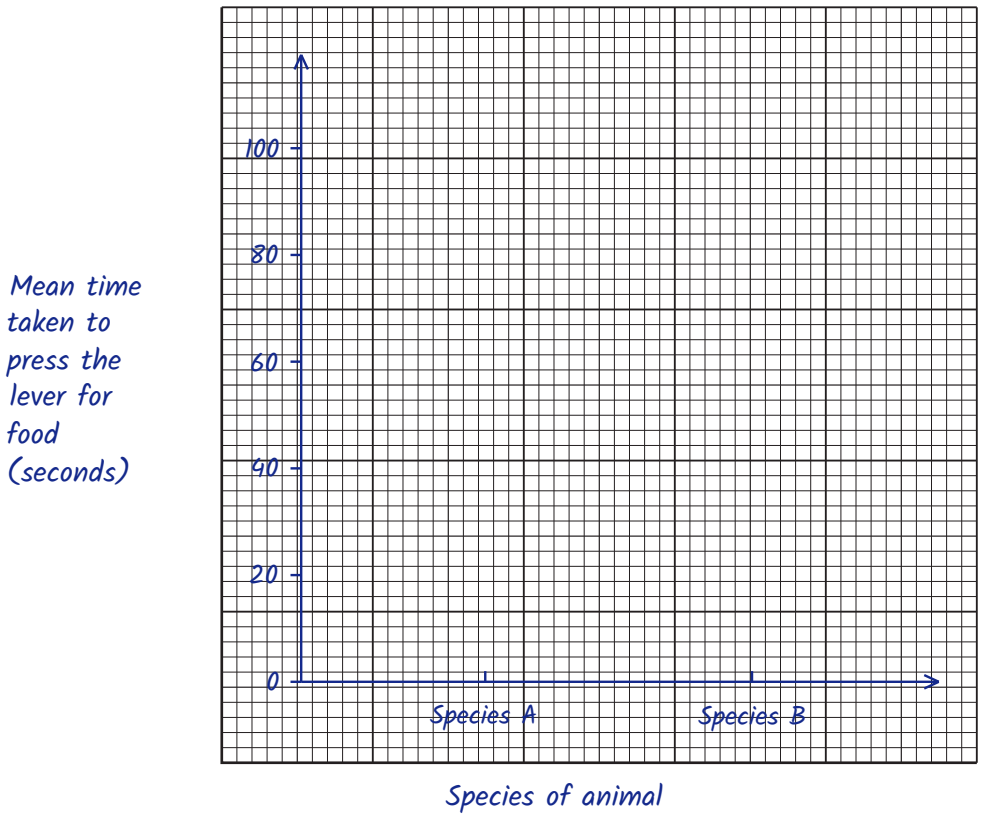
(ii) The two species are very similar, but one is bigger than the other.

For the way that you suggested for measuring how easily the animals learn in part **(a)(i)**: Explain whether this would be valid for both species.

Not valid: the bigger species may reach the lever more easily and press it more quickly because of its size, so it would look as if it learned more easily, when the measure is really affected by size rather than by learning.

..... [2]

(b) Draw the axes for a graph that could be used to show the results of Dr Smith's study using the measure of learning that you suggested in part **(a)(i)**. You **must** label the axes.



[3]

(c) Suggest how Dr Smith could follow **one** ethical guideline in relation to animals, other than 'species'.

Pain and distress: Dr Smith should make sure the animals are not frightened in the Skinner box, e.g. by letting them get used to the box first, keeping it quiet, and removing any animal that shows signs of distress.

..... [2]

8 Josie is collecting data from other students in her class to test the hypothesis 'There is a relationship between tidiness of classwork and enjoyment of lessons'.

(a) Josie will use one of these measures of tidiness:

- look at the work herself and decide whether each student's work is tidy or not
- ask the student to rate the tidiness of their work on a scale of 0 (untidy) to 5 (very tidy).

(i) Explain **one** problem about validity or reliability that Josie could have with **one** of her measures of tidiness.

Students rating their own work: different students may interpret the numbers differently, e.g. one student's "3" may be much tidier than another's "3", so the scale is not used consistently. This is a problem of reliability.

..... [2]

(ii) Explain **one** problem about ethics that Josie could have with **one** of her measures of tidiness.

Josie looking at their work could invade their privacy and cause distress, because students may not want a classmate judging their work, and those whose work she judges untidy could feel embarrassed.

..... [2]

(b) The hypothesis that Josie is testing is correlational.

Explain which **one** of the measures of tidiness in part **(a)** is **not** suitable for Josie to use in her correlation.

Josie deciding whether work is "tidy or not tidy" is not suitable, because it only gives nominal data in two categories, but a correlation needs each co-variable to be measured on a scale (at least ordinal) so the pairs of scores can be plotted.

..... [2]

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(c) Josie's data shows that students who enjoy lessons more have tidier work.

(i) Explain what Josie will conclude about her correlation.

It is a positive correlation: the two variables increase together, so the more students enjoy lessons, the tidier their classwork is.

..... [2]

(ii) Explain whether Josie can conclude that having tidier classwork influences students' enjoyment of lessons.

No, because a correlation does not show causation, so she cannot know which variable affects the other: enjoying lessons might make students keep tidier work. A third variable, such as encouragement from parents, could cause both.

..... [2]

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9 Dr Gao is planning a longitudinal study about changes in reading habits. She will study the same group of participants from childhood, through adolescence and into adulthood.

(a) Dr Gao will need to contact her participants at regular intervals.

(i) Dr Gao is deciding how often to test her participants, and is considering:

- weekly
- yearly.

Explain which of these intervals is the **most** suitable for Dr Gao's study.

Yearly, as reading habits change too slowly to see from week to week.

..... [1]

(ii) Suggest how Dr Gao could contact her participants during the study.

Email or phone them, using contact details collected at the start.

..... [1]

(iii) Suggest **two** problems that Dr Gao may have when trying to contact her participants at regular intervals.

1 *They may have moved house or changed their phone number or email address.*

.....

2 *They may no longer want to take part, so they do not reply.*

.....

[2]

(b) A colleague, Dr Roberts, says that the study could be conducted by comparing participants of different ages at one point in time.

Suggest **one** advantage of Dr Roberts' idea, compared to Dr Gao's plan for a longitudinal study.
Do **not** refer to contacting participants in your answer.

Participants are only tested once, so none drop out over the years (no participant attrition). In a longitudinal study those who drop out may be different, e.g. less keen readers, so Dr Roberts' results would be more representative of reading habits.

..... [2]

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Section B

Answer **all** questions.

10 Dr Miller is researching factors that affect how well people sleep. He wants to know whether creative activities (such as art, music or dance) help people to sleep well.

(a) Describe how Dr Miller could conduct an experiment using an independent measures design to investigate whether creative activities help people to sleep well.

Do **not** describe sample/sampling technique or ethical issues/guidelines in your answer.

Dr Miller would conduct a laboratory experiment in a sleep laboratory. The IV is the type of activity done for one hour (7 pm to 8 pm) before bed: a creative activity, e.g. painting or playing a musical instrument, or a non-creative control activity of the same length, e.g. sorting papers. Using an independent measures design, participants would be randomly allocated to one of the two conditions by drawing names from a hat, so each person does only one activity.

The DV is how well participants sleep, measured objectively with an EEG to record total time asleep, minutes taken to fall asleep and time spent in deep sleep (stages 3 and 4). In the morning each participant would also rate their sleep quality from 1 (very poor) to 10 (excellent).

Controls: everyone goes to bed at 10 pm and is woken at 7 am, in identical quiet, dark bedrooms at the same temperature (18 °C) with the same type of bed. No caffeine after midday and no phones or screens in the evening. Everyone has an adaptation night in the laboratory first, so the unfamiliar setting does not affect sleep, and all receive the same standardised instructions.

The mean total sleep time, time in deep sleep and sleep-quality rating would be compared between the two groups. If the creative group sleeps longer and more deeply, creative activities help people to sleep well.

[10]

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(b) (i) Explain **one** advantage of using an independent measures design in this study compared to using a repeated measures design.

Do **not** refer to ethics in your answer.

There are no order effects; each participant sleeps in the laboratory after only one activity, so they cannot sleep better in a second condition just because they have got used to sleeping in the laboratory.

..... [2]

(ii) Explain **one** disadvantage of using an independent measures design in this study compared to using a repeated measures design.

Do **not** refer to ethics in your answer.

Participant variables; people in the creative group may happen to be naturally better sleepers anyway, so differences in sleep could be due to individual differences rather than the creative activity.

..... [2]

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PSYCHOLOGY **9990/22**

Paper 2 Research Methods **May/June 2025**

1 hour 30 minutes

You must answer on the question paper.

No additional materials are needed.

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Section A

Answer **all** questions.

1 Explain how the independent variable (IV) was operationalised in the study by Andrade (doodling).

The IV was whether participants doodled or not. The doodling group shaded in rows of printed squares and circles on a sheet of paper while listening to the monotonous telephone message; the control group listened to the same message without doodling.

..... [2]

2 In the study by Hassett et al. (monkey toy preferences), some of the data was displayed on graphs. This included a comparison of time spent playing with different types of toys by males and females.

(a) Name the type of graph used to display this data.

A bar chart.

..... [1]

(b) Explain why this graph was a suitable way to display this data.

Sex (male, female) and type of toy (wheeled, plush) are discrete categories, so each is a separate bar on the x-axis with time spent playing on the y-axis, making it easy to compare males and females.

..... [2]

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3 In the study by Milgram, two types of data were collected to demonstrate obedience. One example of each type was:

- voltage reached when the participant refused to continue
- comments from the participants.

(a) For the example of 'voltage reached when the participant refused to continue':

(i) Identify this type of data.

Quantitative data.

..... [1]

(ii) State the highest voltage at which **all** participants obeyed.

300 V

..... [1]

(b) For the example of 'comments from the participants':

(i) Identify this type of data.

Qualitative data.

..... [1]

(ii) Outline **one** of the comments made by a participant in this study.

One participant said, "Well, it's not fair to shock the guy."

..... [1]

(c) Suggest **one** strength of each type of data in this study.

1 *Quantitative: the voltages are objective and can be easily compared and analysed, e.g. it was easy to see that all participants went to at least 300 V and 65% went to the full 450 V.*

.....

2 *Qualitative: the comments give rich detail about participants' thoughts and feelings, e.g. "Oh, I can't go on with this" showed the stress and conflict they felt even while obeying.*

.....

[4]

4 In a study of learning, animals are taught to drop a small object into a hole.

Suggest how 'learning' could be operationalised in this study.

The number of objects (out of 10) the animal drops into the hole on each trial.

..... [1]

5 In some studies, scientific equipment is used to measure variables, such as brain activity or eye movements.

Suggest **two** weaknesses of using scientific equipment to measure variables.

1 *Participants may be frightened by the equipment, e.g. the noise and enclosed space of a brain scanner, so their behaviour and brain activity may not be as in real life, lowering validity.*

.....

2 *The equipment could be faulty without the researcher knowing, so it may measure inconsistently between participants, lowering reliability, or measure the wrong thing.*

.....

.....

[4]

6 Describe order effects, using any example(s).

Order effects happen when participants do the same or similar tasks more than once, as in a repeated measures design, so their performance is affected by the order in which they do the conditions rather than by the IV. Practice effects mean performance improves with repetition, e.g. remembering the answers to a memory test or becoming more skilled at a physical task. Fatigue effects mean performance gets worse because participants become tired or bored, e.g. losing concentration on later tasks in a long study. Order effects can be controlled by counterbalancing: half the participants do condition A then B, the other half B then A. For example, Hölzel et al. used a repeated measures design, giving participants the FFMQ before and after the eight-week MBSR course, so there was a risk of order effects as they had seen the questions before. Pozzulo et al. varied the order of the video clips to reduce order effects.

..... [6]

7 Inma is observing one student at a time in the playground, to investigate how often each individual talks to other students. Inma is concerned about two uncontrolled variables:

- a student being observed when few other students are present
- a student with a headache may talk less.

(a) (i) Explain which **one** of these is a participant variable.

The headache, because it is internal to the individual student.

..... [1]

(ii) Suggest how Inma could limit the effect of the participant variable.

Inma could ask each student about their health after the observation and remove anyone who had a headache from the data, or observe each student on several different days so the data represents their usual behaviour.

..... [2]

(b) (i) Explain which **one** of these is a situational variable.

Few students present, because it is external, in the environment.

..... [1]

(ii) Suggest how Inma could limit the effect of the situational variable.

Inma could only observe when the playground is crowded, e.g. at the start of lunchtime when more than 50 students are there, so every student has the same opportunity to talk to others.

..... [2]

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(c) Inma is also concerned about the effect of social desirability on her results.

(i) Suggest **one** way that social desirability could affect Inma's results.

If students realise that Inma is watching how much they talk, they may want to look friendly and popular, so they talk more than usual, exaggerating how often they talk to others.

..... [2]

(ii) Suggest how Inma might reduce the effect of social desirability on her results.

She could be a covert observer, e.g. pretending to be a teacher on playground duty, so the students do not know that they are being observed or that the study is about talking.

..... [2]

8 Kong is interviewing people about friendliness. He tells his participants his study is about how they spend their free time. Kong uses two measures of friendliness:

- timing the duration of eye contact between himself and each participant
- asking the question, 'Are you excited or scared at parties?'

(a) (i) State which measure of central tendency Kong should use to analyse his data from timing the duration of eye contact.

Mean .....

..... [1]

(ii) State which measure of central tendency Kong should use to analyse his data from asking participants, 'Are you excited or scared at parties?'

Mode .....

..... [1]

(b) Kong's friend says that both of his measures of friendliness could be unethical, but for different reasons.

(i) Explain **one** reason why timing the duration of eye contact could break **one** ethical guideline.

Deception: participants are told the study is about free time and do not know .....

their eye contact is being timed, so they cannot give fully informed consent. .....

.....

..... [2]

(ii) Explain **one** reason why asking participants, 'Are you excited or scared at parties?' could break **one** ethical guideline.

You **must** use a different ethical guideline from your answer to part **(b)(i)**.

Protection from harm: shy participants could be embarrassed or distressed by .....

having to admit that they feel scared at parties. .....

.....

..... [2]

(c) Kong will use opportunity sampling.

Outline what is meant by 'opportunity sampling', using Kong's study as an example.

Opportunity sampling uses people who are available and nearby at the time. Kong .....

could ask people sitting in a local park to be interviewed. .....

.....

..... [2]

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9 Dr Shaw is planning a questionnaire about early childhood memories.

(a) There are **two** techniques for presenting a questionnaire to participants.

Identify the **two** techniques.

1 *Paper and pencil (written)*

2 *Online (by computer)*

[2]

(b) For **one** of the questionnaire techniques that you identified in part **(a)**:

Suggest **one** reason why this would be appropriate for Dr Shaw to use.

Paper and pencil: participants can fill it in privately at home, which suits this sensitive topic, as some early childhood memories may be unpleasant, so they are more likely to answer honestly.

[2]

Section B

Answer **all** questions.

10 Dr Brent works in a busy hospital. There are noises from equipment and people on the wards. He thinks there might be a link between two variables:

- how noisy wards are
- the quality of patients' sleep.

(a) Describe how Dr Brent could conduct a study to investigate whether there is a correlation between how noisy wards are and the quality of patients' sleep.

Do **not** describe sample / sampling technique or ethical issues / guidelines in your answer.

Dr Brent would conduct a correlational study on several wards, measuring two co-variables for each patient over one night: how noisy the ward is and the quality of the patient's sleep. Nothing is manipulated.

Noise would be measured with a decibel meter by each patient's bed, recording the sound level every minute from 10 pm to 6 am; the mean level in decibels (dB) is that patient's noise score.

Sleep quality would be measured by a questionnaire at 8 am the next morning. Patients rate five statements, e.g. "I slept deeply" and "I woke up feeling rested", from 1 (strongly disagree) to 5 (strongly agree), giving a score from 5 to 25 where higher means better sleep. Nurses doing hourly checks would also record how many times each patient was awake. Every patient gets the same standardised instructions.

Each patient's pair of scores would be plotted on a scattergraph with noise (dB) on the x-axis and sleep-quality score on the y-axis. Dr Brent expects a negative correlation: the noisier the ward, the poorer the sleep. If the points lie close to a downward-sloping line the correlation is strong, and a correlation coefficient near −1 would confirm this. A positive correlation would mean noisier wards go with better sleep, and randomly scattered points would show no correlation.

[10]

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(b) For **one** of the variables you have described in part **(a)**:

Explain **one** practical strength and **one** practical limitation in relation to this variable.

Variable: ward noise, measured with a decibel meter.

Practical strength: the meter records objectively and automatically all night, so no staff time is needed and the readings are consistent across wards, making the measure reliable.

Practical limitation: the meter records every sound near the bed, including the patient's own snoring or coughing, so it may not measure ward noise accurately; also a meter is needed for every bed, which is costly.

..... [4]

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PSYCHOLOGY **9990/23**

Paper 2 Research Methods **May/June 2025**

1 hour 30 minutes

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Section A

Answer **all** questions.

1 **(a)** Outline the ethical guideline of 'confidentiality'.

Keeping participants' identities and personal data secret, so they cannot be identified.

..... [1]

(b) Explain **one** way that the ethical guideline of confidentiality was followed in the study by Dement and Kleitman (sleep and dreams).

The participants were only identified by their initials (e.g. WD, KC) rather than their names, so nobody reading the study could identify them.

..... [2]

2 Cognitive psychologists sometimes study people's recall of past events.

(a) Outline what is meant by 'subjectivity'.

Interpreting things from your own perspective, influenced by personal bias.

..... [1]

(b) Suggest how subjectivity could be a problem when studying people's recall of past events.

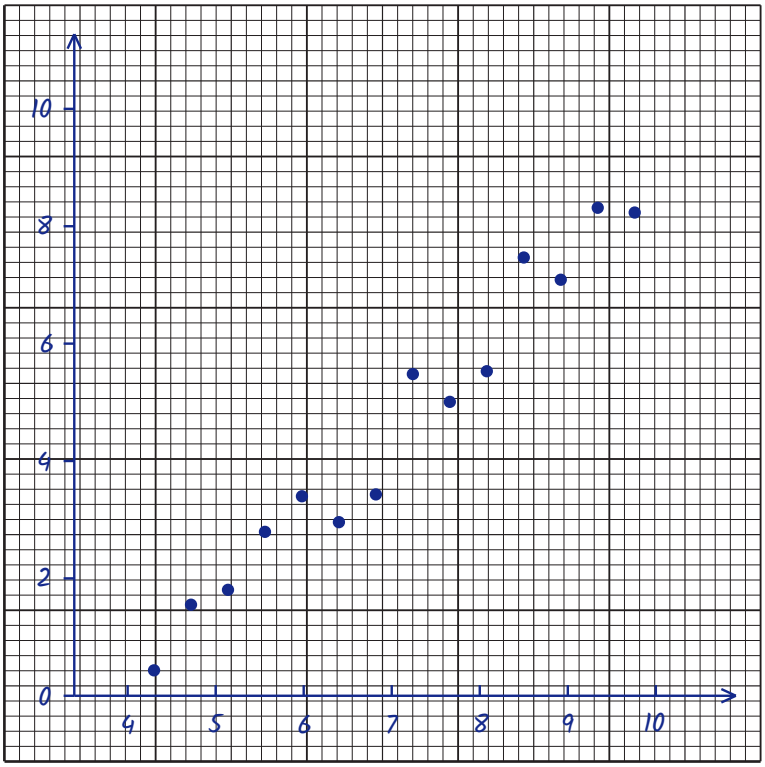
Recall of a past event may be distorted by the person's own feelings and later experiences, so two people may recall the same event very differently, and the researcher cannot tell which account is accurate.

..... [2]

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3 A study tested the relationship between average number of hours of sleep per night and physical health. The participants slept in their own homes. The results showed a positive correlation.

(a) Sketch a graph to show the results of this study. You **must** label the axes.



Physical health score

(0 poor to 10 excellent)

Average hours of sleep per night

[3]

(b) Suggest **two** problems with collecting data about the number of hours of sleep in this study.

1 Participants may not report their hours of sleep accurately; they may not know when they fell asleep, or may say they sleep longer than they do to seem healthy (social desirability).

2 Sleep at home cannot be controlled, e.g. it may be disturbed by noise, children or pets, so the hours recorded may vary for reasons other than the person's usual sleep pattern.

[4]

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4 An investigation is testing the hypothesis that, 'intelligence affects obedience'.

State whether this is a directional or a non-directional hypothesis. Justify your answer.

Non-directional, because it only states that the level of obedience (DV) will differ depending on intelligence (IV); it does not say whether more intelligent people will be more or less obedient.

..... [2]

5 In the study by Bandura et al. (aggression), a sample of children was recruited from a university nursery. The sampling technique is not stated.

Suggest why Bandura et al. may **not** have used volunteer sampling.

Volunteer sampling could have produced a biased sample: parents of aggressive children might have been too embarrassed to volunteer their child, so fewer aggressive children would take part and the sample would not be representative.

..... [2]

6 Describe structured interviews and semi-structured interviews, using any example(s).

Interviews are a self-report method in which the researcher asks the participant questions in real time, face to face or by phone, using open or closed questions. In a structured interview the interviewer follows a fixed script, asking every participant the same questions in the same order with no extra questions, and may also standardise their tone of voice and dress, so answers are easy to compare. For example, a researcher could ask every student the same ten questions about sleep, e.g. "How many hours do you sleep on a school night?"

In a semi-structured interview some questions are fixed and asked to everyone, but the interviewer can add follow-up questions based on each participant's responses, to explore answers in more depth. For example, Dement and Kleitman asked every participant whether they had been dreaming, and sometimes asked more about each dream.

..... [6]

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7 Dr Jones is conducting a case study of a man, Kevan, who has been practising mindfulness for 10 years.

(a) Suggest **two** questions that Dr Jones could use in a self-report (questionnaire or interview) that would investigate different features of Kevan's mindfulness.

1 *How often do you practise mindfulness each week?*

2 *How easy is it for you to enter a mindful state, from 0 to 5?*

[2]

(b) Dr Jones wants to investigate whether Kevan has changed in any ways that could be linked to his mindfulness. He plans to interview Kevan's friends.

(i) Suggest **two** changes in Kevan that his friends could observe. These changes **must** be behavioural, emotional or cognitive.

1 *He may sleep better and seem less tired.*

2 *He may be friendlier and more sociable with other people.*

[2]

(ii) Explain why **one** of the changes that you suggested in part **(b)(i)** would be difficult to investigate.

It would be difficult for friends to observe his sleep, because they usually do not live with him, so they would not see how well he sleeps regularly and could only report what he tells them.

[2]

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(c) Dr Jones has several different questions on his self-report that he has used repeatedly with a similar case. He has identified two problems:

- Problem 1: when he studies the responses to one item, he discovers that there are several different ways to interpret the answers.
- Problem 2: he is concerned that another item, which was supposed to measure mindfulness, is measuring happiness instead.

(i) Explain which problem relates to reliability.

Problem 1, because the answers are not interpreted consistently.

..... [1]

(ii) Explain which problem relates to validity.

Problem 2, because it is not measuring what it claims to measure.

..... [1]

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8 Dr Mohan has proposed a study using monkeys in a laboratory. A colleague has two suggestions to make the study more ethical:

- suggestion 1: using animals which have less complex brains
- suggestion 2: using videos of the animals' behaviour in their natural habitat.

(a) Explain why suggestion 1 would make Dr Mohan's study more ethical.

Species: animals with less complex brains, e.g. rats rather than monkeys, are likely to experience less distress and suffering, so less harm is caused while still meeting the aim.

..... [2]

(b) Explain why suggestion 2 would make Dr Mohan's study more ethical.

Replacement: no animals need to be kept in a laboratory, as the animals are filmed undisturbed in the wild, so they are not distressed by captivity or handling.

..... [2]

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9 Kioni is conducting a longitudinal study. Her aim is to study changes in preferred personal space throughout her participants' lives.

(a) Kioni is deciding how frequently throughout her participants' lives she should test them.

Suggest a suitable frequency for Kioni to use to test her participants throughout their lives.

Every five years, e.g. at ages 5, 10, 15, 20 and so on throughout their lives.

..... [1]

(b) Suggest **one** way for Kioni to re-contact her participants each time she needs to test them.

Collect email addresses at the start, then email each participant to say their next personal space test is due and ask whether they still want to take part.

..... [2]

(c) **(i)** Describe **one** way that Kioni could measure personal space.

Perry et al.'s computerised CID: the participant imagines standing in the centre of a room on screen while a figure approaches from different entrances, and presses the space bar when they want it to stop.

..... [2]

(ii) For the way you described in part **(c)(i)**:

Suggest **one** strength of measuring personal space in this way.

High ecological validity, because the figure moves towards the participant, just as real people approach us in everyday life, so it gives a more realistic measure than a static drawing.

..... [2]

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(d) Kioni is concerned that there may be variables other than age that could affect an individual's personal space preferences.

(i) Suggest **two** variables that could affect an individual's preferred personal space, other than age and gender.

1 *Culture*

2 *Personality (introversion or extraversion)*

[2]

(ii) For **one** of the variables that you suggested in part **(d)(i)**:

Suggest how this variable could affect an individual's preferred personal space.

Culture: being close to others is more acceptable in some cultures than others, e.g. Latino and Mediterranean people tend to prefer smaller personal space than Anglo-Saxon people, so they would let others come closer.

[2]

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Section B

Answer **all** questions.

10 Isla is a teacher. She thinks that allowing students to play with an object in class will improve attention. Isla is unsure whether it will be better to play with a pen or play with a different object that is not used for writing.

(a) Describe how Isla could conduct an experiment to test whether attention is better if students can play with a pen or play with an object that is not used for writing.

Do **not** describe sample / sampling technique or ethical issues / guidelines in your answer.

Isla would conduct a field experiment in her own classroom during normal lessons. The IV is the object students can play with during the lesson: a pen (a plastic click pen) or a non-writing object of a similar size, e.g. a small rubber stress ball. Students do not write with the object.

A repeated measures design would be used, so each student does both conditions, controlling participant variables such as natural attention span. It would be counterbalanced: half the class has the pen in the first lesson and the stress ball in the second, and the other half the opposite order, to control order effects.

The DV is attention, operationalised as the score on a 10-question multiple-choice test about the lesson content at the end of each lesson, so a higher score means better attention.

Controls: both lessons would be in the same classroom, at the same time of day (10 am), last 30 minutes and be taught by Isla in the same way. The topics would be of similar difficulty and interest, and both tests equally difficult. All students hear the same standardised instructions: "You may play with this object quietly during the lesson, but keep listening."

Isla would compare the mean test scores in the pen and stress ball conditions to see which object gives better attention.

..... [10]

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(b) For **one** feature of the experiment you have described in part **(a)**:

(i) Explain why that feature is a strength of the study.

Do **not** refer to sampling or ethics in your answer.

Repeated measures design: each student is compared with themselves in both conditions, so participant variables such as natural attention span cannot explain the difference in test scores between the pen and the stress ball.

..... [2]

(ii) Explain how that feature could be a weakness of the study.

Do **not** refer to sampling or ethics in your answer.

Because students do both conditions, they may guess the aim after the second lesson and try harder to pay attention with the object they think Isla expects to work, so demand characteristics could affect the scores.

..... [2]

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