Cambridge Assessment International Education

Cambridge International AS & A Level

CANDIDATE NAME: StemUp Model Solution

CENTRE NUMBER | | | | | |

CANDIDATE NUMBER | | | | |

5567598321

PSYCHOLOGY **9990/21**

Paper 2 Research Methods **October/November 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.
- Do **not** write on any bar codes.

INFORMATION

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

This document has **12** pages. Any blank pages are indicated.

© UCLES 2025

[Turn over

stemup.co.uk

Section A

Answer **all** questions.

1 A researcher is conducting an observation to investigate the study habits of students. The observation uses a fixed list of behavioural categories.

(a) Explain whether this observation is structured or unstructured.

Structured, because the researcher uses a fixed list of behavioural categories, so only these set behaviours are recorded. [1]

(b) (i) Suggest **two** behavioural categories that the researcher could use to observe the study habits of students.

1) Note taking: the student writes notes from a textbook or a screen.

2) Using flashcards: the student tests themselves with revision cards.

[2]

(ii) For **one** of the behavioural categories you suggested in part **(b)(i)**:

Suggest **one** methodological problem with using this category to observe the study habits of students.

Note taking is hard to operationalise: it is difficult to decide when one "note" ends and the next begins, or whether highlighting or doodling counts as a note, so the observer may record it inconsistently and under- or overestimate how often it happens. [2]

2 In the study by Saavedra and Silverman (button phobia), imagery exposure was investigated. During this, the boy reported a 'severity rating' for distress at three different 'time frames'.

(a) State what was meant by the time frames 1, 2 and 3.

Time frame 1: *before the imagery exposure session started.*

Time frame 2: *midway (halfway) through the imagery exposure session.*

Time frame 3: *after the imagery exposure session had finished.*

[2]

DO NOT WRITE IN THIS MARGIN

(b) Outline the change in severity rating from time frame 1 to time frame 3, when the boy had to imagine hundreds of buttons falling on his body.

His distress (severity) rating decreased from time frame 1 to time frame 3, so his distress fell as the session went on. [1]

3 The study by Hölzel et al. (mindfulness and brain scans) used participants who wanted to reduce their stress and were able to have an MRI scan. There were several other inclusion criteria (reasons for being included in the sample).

(a) Outline **two** other inclusion criteria.

1 *No meditation classes in the past six months.*

2 *Not taking any medication.*

[2]

(b) For each of the inclusion criteria outlined in part **(a)**:

Suggest why each inclusion criterion was important in this study, other than to ensure that the experimental and control groups were similar.

1 *So that any brain changes (e.g. in grey matter) were due to the 8-week MBSR course, not to earlier meditation classes.*

2 *Medication could reduce stress or change the brain even without mindfulness, so it would be a confounding variable.*

[2]

4 The study by Baron-Cohen et al. (eyes test) used an independent measures design.

(a) Explain **one** strength of using an independent measures design.

It can be used to compare pre-existing groups: participants with autism or AS could not also be in the control group, so this was the only possible design. It also avoids order effects, such as practice, because each person only did the Eyes Test once.

[2]

DO NOT WRITE IN THIS MARGIN

(b) Explain **one** weakness of using an independent measures design.

Individual differences between the groups are hard to control, so they may be confounding variables. For example, the control group may have had more experience of reading faces or a higher IQ than the AS/HFA group, so the difference in Eyes Test scores may not be due to autism alone. [2]

5 Sketch a graph on the axes in Fig. 5.1 to show a negative correlation between 'time spent watching television' and 'attention span'. You **must** label the axes.

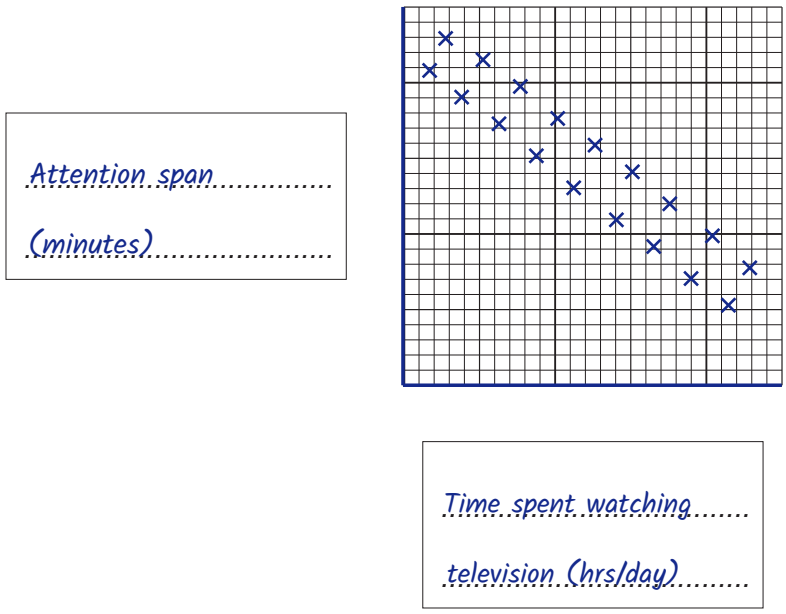


Fig. 5.1

[2]

DO NOT WRITE IN THIS MARGIN
DO NOT WRITE IN THIS MARGIN
DO NOT WRITE IN THIS MARGIN
DO NOT WRITE IN THIS MARGIN
DO NOT WRITE IN THIS MARGIN

DO NOT WRITE IN THIS MARGIN
DO NOT WRITE IN THIS MARGIN
DO NOT WRITE IN THIS MARGIN
DO NOT WRITE IN THIS MARGIN
DO NOT WRITE IN THIS MARGIN

6 Describe measures of central tendency, using any example(s).

Measures of central tendency are ways of finding a single typical or "average" value that summarises a set of numerical data. There are three: the mode, the median and the mean. The mode is the most frequent score, e.g. in 2, 3, 3, 5, 9 the mode is 3. The median is the middle score when all the scores are put in rank order (with an even number of scores, it is halfway between the two middle scores), so for 2, 3, 3, 5, 9 it is 3; it is not affected by extreme scores. The mean is calculated by adding up all the scores and dividing by the number of scores: (2 + 3 + 3 + 5 + 9) ÷ 5 = 4.4. It uses every score, so it is the most sensitive measure, but it is distorted by outliers. For example, Bandura et al. calculated the mean number of aggressive acts imitated by the children in each condition, and Baron-Cohen et al. compared the mean Eyes Test scores of the autism/AS group and the control groups.

..... [6]

7 Professor March is interested in interpersonal distance. He has met Dennis, who needs a large interpersonal distance. Dennis has agreed to Professor March conducting a case study about him using a questionnaire.

(a) Suggest why Dennis may prefer Professor March to use a questionnaire rather than a face-to-face interview.

With a questionnaire Professor March does not need to be in the same room or close to Dennis, so Dennis will not feel uncomfortable. [1]

(b) Suggest **two** examples of questions that Professor March could use to collect data about the need Dennis has for a large interpersonal distance.

1 *How do you feel when someone stands or sits close to you? Describe your feelings.*

.....

2 *On a scale of 0 (comfortable) to 10 (very uncomfortable), how did you feel when we first met?*

[2]

stemup.co.uk

(c) Suggest **one** problem that Professor March could have when using a questionnaire to study Dennis.

Dennis may give socially desirable answers, because needing a large personal space is a sensitive, personal topic and he may want to appear "normal", so he may play down his feelings. Unlike in a face-to-face interview, Professor March cannot see Dennis's body language or ask follow-up questions, so he will not know whether Dennis is being honest. This lowers the validity of the data.

..... [3]

8 Dr East is observing children playing. She is a participant observer. The children have met Dr East before and believe she is a playground assistant who watches them when their teachers have lunch.

(a) Suggest **one** strength of using participant observation in this study.

Dr East can get close to and interact with the children, so she can see exactly what they are playing with and ask them about their games. This means she is more likely to understand their play.

..... [2]

(b) Suggest **one** advantage of Dr East using a non-participant observation compared to a participant observation.

With non-participant observation the children would be unaware that they are being watched, as there is distance between Dr East and the children, so their play and games would be more natural, with fewer demand characteristics.

..... [2]

(c) Explain **one** ethical problem caused by the children believing that Dr East is a playground assistant.

The children are being deceived (misled), because they believe Dr East is only a playground assistant, not a researcher who is observing them. So the children (and their parents) cannot give informed consent to being studied.

..... [2]

DO NOT WRITE IN THIS MARGIN
DO NOT WRITE IN THIS MARGIN
DO NOT WRITE IN THIS MARGIN
DO NOT WRITE IN THIS MARGIN
DO NOT WRITE IN THIS MARGIN

DO NOT WRITE IN THIS MARGIN
DO NOT WRITE IN THIS MARGIN
DO NOT WRITE IN THIS MARGIN
DO NOT WRITE IN THIS MARGIN
DO NOT WRITE IN THIS MARGIN

9 Dr Okami is using animals in an experiment to study the effects of noise on learning. In this study, the animals will learn to run through narrow tunnels and will meet other animals. Each animal will **either** run through the tunnels with noise **or** run through the tunnels without noise.

(a) Explain whether the experimental design of Dr Okami's study is repeated measures or independent measures.

Independent measures, because each animal does only one level of the IV: it runs through the tunnels either with noise or without noise, not both. [1]

(b) The independent variable is 'with noise or without noise' and the dependent variable is 'learn to run through the tunnels'.

Define what is meant by the terms 'independent variable' and 'dependent variable'.

independent variable *The variable that the researcher manipulates (changes) to create two or more conditions.*

dependent variable *The variable that the researcher measures to see the effect of the IV.*

[2]

(c) Dr Okami needs to follow ethical guidelines in relation to animals.

(i) Dr Okami will use reinforcement to help the animals learn to run through the narrow tunnels.

Suggest **one** way that the animals could be reinforced. Your answer **must** be ethical.

Give the animal a small food treat each time it gets through the tunnel.

..... [1]

(ii) Dr Okami needs to follow the guideline of 'species'.

Explain **two** ways that Dr Okami's choice of animal will be affected by following this guideline.

1) Dr Okami should choose a small species, such as rats or mice, rather than a large animal, because the tunnels are narrow, so a larger animal could be cramped, distressed or get stuck.

2) He should choose a social species that naturally lives in groups, such as rats, because the animals will meet other animals in the tunnels; a solitary or territorial species could become stressed or aggressive and injure each other.

..... [4]

(iii) Dr Okami needs to follow the guideline of 'minimising harm'.

Suggest why this guideline is relevant to Dr Okami's study.

The noise could be distressing or even painful for the animals, so it must be kept at a safe volume for a short time. Meeting other animals in narrow tunnels may also cause fear or fighting, so animals should be watched and removed if distressed. [2]

DO NOT WRITE IN THIS MARGIN
DO NOT WRITE IN THIS MARGIN
DO NOT WRITE IN THIS MARGIN
DO NOT WRITE IN THIS MARGIN
DO NOT WRITE IN THIS MARGIN

DO NOT WRITE IN THIS MARGIN
DO NOT WRITE IN THIS MARGIN
DO NOT WRITE IN THIS MARGIN
DO NOT WRITE IN THIS MARGIN
DO NOT WRITE IN THIS MARGIN

Section B

Answer **all** questions.

10 Dr Aster is interviewing people about their exciting experiences. He is interested in peoples' feelings about different types of exciting experience.

(a) Describe how Dr Aster could conduct a study using an interview to investigate peoples' feelings about different types of exciting experience.

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

Dr Aster would use a semi-structured, face-to-face interview in a quiet room. Every participant is asked the same fixed questions in the same order, but he can add follow-up questions if a person says something interesting, e.g. "Why did that make you feel so alive?". Each interview lasts about 20 minutes and is audio-recorded and transcribed. He first asks participants to list their exciting experiences, and classifies them into types: physical (e.g. a rollercoaster ride), social (e.g. a concert) and achievement (e.g. winning a match).

The interview has closed questions, giving quantitative data, and open questions, giving qualitative data. Closed question: "On a scale of 1 (not at all) to 10 (extremely), how happy did you feel during this experience?", also asked for fear and nervousness, for each type of experience. Open questions: "Describe how you felt just before the experience started" and "Explain why you would or would not want to do it again". Filler questions, e.g. "What is your favourite food?", hide the aim to reduce demand characteristics.

Analysis: for each rating the mean and range are calculated for each type of experience and shown in a bar chart, e.g. to compare fear in physical and social experiences. The open answers are analysed using thematic analysis: Dr Aster identifies common themes, such as "fear turning into relief" or "feeling close to others", and counts how often each theme occurs for each type of experience, with quotes as examples. [10]

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

(i) Describe **one** practical/methodological strength of this part of the procedure.

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

The 1 to 10 rating scale gives quantitative data, which is objective and easy to analyse; Dr Aster can calculate means and directly compare feelings across the types of exciting experience without interpreting answers, so the data are more reliable. [2]

(ii) Describe **one** practical/methodological weakness of this part of the procedure.

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

The rating scale limits answers; a person may feel a mixture of fear and joy that one number cannot capture, and people may interpret "7" differently, so the scores may not reflect their real feelings, lowering validity.

..... [2]

DO NOT WRITE IN THIS MARGIN
DO NOT WRITE IN THIS MARGIN
DO NOT WRITE IN THIS MARGIN
DO NOT WRITE IN THIS MARGIN
DO NOT WRITE IN THIS MARGIN

BLANK PAGE

DO NOT WRITE IN THIS MARGIN
DO NOT WRITE IN THIS MARGIN
DO NOT WRITE IN THIS MARGIN
DO NOT WRITE IN THIS MARGIN
DO NOT WRITE IN THIS MARGIN

BLANK PAGE

DO NOT WRITE IN THIS MARGIN
DO NOT WRITE IN THIS MARGIN
DO NOT WRITE IN THIS MARGIN
DO NOT WRITE IN THIS MARGIN
DO NOT WRITE IN THIS MARGIN

Permission to reproduce items where third-party owned material protected by copyright is included has been sought and cleared where possible. Every reasonable effort has been made by the publisher (UCLES) to trace copyright holders, but if any items requiring clearance have unwittingly been included, the publisher will be pleased to make amends at the earliest possible opportunity.

To avoid the issue of disclosure of answer-related information to candidates, all copyright acknowledgements are reproduced online in the Cambridge Assessment International Education Copyright Acknowledgements Booklet. This is produced for each series of examinations and is freely available to download at www.cambridgeinternational.org after the live examination series.

Cambridge Assessment International Education is part of Cambridge Assessment. Cambridge Assessment is the brand name of the University of Cambridge Local Examinations Syndicate (UCLES), which is a department of the University of Cambridge.

© UCLES 2025

stemup.co.uk

Cambridge Assessment International Education

Cambridge International AS & A Level

CANDIDATE NAME: StemUp Model Solution

CENTRE NUMBER | | | | | |

CANDIDATE NUMBER | | | | |

9996831602 4

PSYCHOLOGY **9990/22**

Paper 2 Research Methods **October/November 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.
- Do **not** write on any bar codes.

INFORMATION

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

This document has **12** pages. Any blank pages are indicated.

© UCLES 2025

[Turn over

stemup.co.uk

Section A

Answer **all** questions.

1 **(a)** Outline what is meant by the term 'fatigue effect'.

When participants' performance gets worse during a study because they become tired or bored from repeating tasks. [1]

(b) Suggest **one** fatigue effect that could have occurred in the study by Hölzel et al. (mindfulness and brain scans).

Participants may have become bored with the daily mindfulness homework (e.g. the body scan) over 8 weeks and stopped doing it. [1]

2 Data can be qualitative or quantitative.

(a) Outline what is meant by 'qualitative data'.

Descriptive data in words, which gives in-depth detail and insight, rather than numbers. [1]

(b) Describe the qualitative data that was collected from **one** of the following studies:

- Milgram (obedience)
- Piliavin et al. (subway Samaritans).

Milgram: observers wrote down what participants said and did as they gave the shocks, such as sweating, trembling, nervous laughter and protests, e.g. saying they did not think it was humane. Participants were also interviewed afterwards about how they felt and whether they regretted taking part. [2]

3 In the study by Fagen et al. (elephant learning) behaviours such as, 'trunk here', 'trunk up' and 'bucket', were recorded using a structured observation.

Explain **one** strength of using a structured observation in this study.

It improves reliability: as the behaviours were set categories such as "trunk up" and "trunk here", two observers could record the same elephant and check that they agreed. Observers also focus only on the relevant behaviours, not being distracted by other elephant behaviour. [2]

DO NOT WRITE IN THIS MARGIN

DO NOT WRITE IN THIS MARGIN
DO NOT WRITE IN THIS MARGIN
DO NOT WRITE IN THIS MARGIN
DO NOT WRITE IN THIS MARGIN
DO NOT WRITE IN THIS MARGIN

4 In the study by Pozzulo et al. (line-ups):

(a) There was a sample of children and a sample of adults. In both samples there were some males and some females.

Suggest why it was important that **both** males and females were present in **both** samples.

Males and females might differ in how well they identify faces, e.g. in recall or in their knowledge of cartoon characters. If one age group had more males, gender would be a confounding variable, hiding the real effect of age on identification accuracy.

..... [2]

(b) The standard deviation for the age of the adults was larger than the standard deviation for the age of the children.

(i) Describe what is meant by a 'standard deviation'.

A measure of spread (dispersion) of a set of scores that shows how much, on average, the scores vary from the mean. A large standard deviation means the scores are widely spread out around the mean.

..... [2]

(ii) Explain **one** reason why the standard deviation for the age of the adults was larger than the standard deviation for the age of the children.

The spread of ages was greater for the adults. The children had to be young, within a narrow range of a few years (about 4 to 7), whereas adults' ages can range across several decades of adulthood, so their ages vary more from the mean. ..... [2]

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

Interviews are a self-report method where a researcher asks a participant questions directly, usually face-to-face and in real time. In a semi-structured interview there are some fixed questions that every participant is asked, but the interviewer can add extra follow-up questions depending on the participant's answers. For example, Dement and Kleitman asked all participants whether they had been dreaming when they were woken, and if they had, they were asked further questions about the dream. This gives comparable data but still allows detail. In an unstructured interview there are no set questions; each question follows on from the participant's previous answer, like a conversation, so the interviewer can pursue interesting lines of thought. This gives rich qualitative data but is hard to compare between people. For example, Saavedra and Silverman asked the boy and his mother about stressful life events that may have triggered the onset of his button phobia. [6]

DO NOT WRITE IN THIS MARGIN
DO NOT WRITE IN THIS MARGIN
DO NOT WRITE IN THIS MARGIN
DO NOT WRITE IN THIS MARGIN
DO NOT WRITE IN THIS MARGIN

DO NOT WRITE IN THIS MARGIN
DO NOT WRITE IN THIS MARGIN
DO NOT WRITE IN THIS MARGIN
DO NOT WRITE IN THIS MARGIN
DO NOT WRITE IN THIS MARGIN

6 Dr Raj is conducting a case study to investigate an elderly man, who he refers to as 'Mr J', who has an exceptional memory.

(a) Dr Raj is considering the ethics of his study.

(i) Explain **one** ethical reason why Dr Raj refers to his participant as Mr J.

Confidentiality: Mr J should not be identifiable, because his exceptional memory is rare and his personal life memories could make him recognisable, so his real name must not be published.

..... [2]

(ii) Mr J can recall most of his life events, including negative ones.

Explain the ethical guideline Dr Raj should follow when studying Mr J because he can remember negative life events.

Protection from psychological harm: recalling negative life events, such as a bereavement, could make Mr J upset or distressed, so Dr Raj should avoid probing these memories, stop if he is upset and remind him of his right to withdraw.

..... [2]

(b) Dr Raj wants to triangulate his data.

Explain what is meant by triangulation, using Dr Raj's study as an example.

Triangulation means using more than one technique to collect data about the same thing, to check that the findings agree. For example, Dr Raj could test Mr J's memory with interviews and a questionnaire, and check his memories with his family.

..... [2]

(c) Explain **two** weaknesses of case studies.

1) Low generalisability: case studies are usually of one person with unique characteristics, such as Mr J's rare memory, so the findings cannot be applied to other people, not even all other people with exceptional memories.

2) Researcher bias: the researcher works with the participant intensely and may form a bond with him, so they may record his answers in a way that makes him "look good", e.g. ignoring memories that Mr J gets wrong, which lowers validity.

..... [4]

7 Lorna has noticed that children often talk to their toys. She thinks this may be related to the children's vocabulary size (how many words they know). Lorna is planning a correlational study to investigate whether there is a relationship between how often the child talks to their toys and the child's vocabulary size.

(a) Suggest **one** way that Lorna could measure a child's vocabulary size.

Record the child talking for an hour and count the number of different words used.

..... [1]

(b) Lorna must ask the children and their parents/guardians for consent to participate in her study.

(i) Explain why it is important to ask **both** the children and their parents/guardians for consent in this study.

Consent means participants understand the study and agree to it. Young children cannot fully understand the study, so they cannot give valid consent alone and their parents must agree. The children must also be asked so that they agree to take part. [2]

(ii) Suggest **one** suitable way that Lorna could ask for consent from the children.

Lorna could ask in simple words: "Would you like to come and play with my toys and talk to me for a little while?" and only include children who say yes.

..... [2]

(c) Lorna finds a positive correlation. She concludes that vocabulary size in children is increased by talking to toys more often.

Explain why this conclusion is **not** correct.

A correlation cannot show cause and effect, so she can only conclude that talking to toys and vocabulary size are related. A third factor, e.g. parents who talk a lot with their child, could cause both more talking to toys and a bigger vocabulary.

..... [2]

DO NOT WRITE IN THIS MARGIN

DO NOT WRITE IN THIS MARGIN
DO NOT WRITE IN THIS MARGIN
DO NOT WRITE IN THIS MARGIN
DO NOT WRITE IN THIS MARGIN
DO NOT WRITE IN THIS MARGIN

8 Dr Chand is going to measure how much adults want to participate in social activities, such as team sports or attending a festival.

(a) Dr Chand wants to collect quantitative data about how much adults want to participate in social activities. He can use the methods of questionnaires or interviews.

Suggest **two** ways that Dr Chand could collect this data using one or both of these methods.

1 *Questionnaire, closed question: "How much do you want to join social activities? Rate from 0 (not at all) to 15 (very much)."*

2 *Interview, open question: "Describe how you feel about going to a festival", then score the answer from 0 to 15.*

[2]

(b) For **one** of the ways of collecting data you suggested in part **(a)**:

(i) Explain **one** way this method of collecting data is valid.

Way 1: the questionnaire can be done anonymously online, so adults who are embarrassed about not wanting to join in social activities are more likely to answer honestly than face-to-face, so the scores show their real willingness.

..... [2]

(ii) Explain **one** way this method of collecting data is not valid.

Way 1: the closed rating scale limits answers to one number, but willingness may depend on the activity, e.g. a person may love festivals but hate team sports, so one score from 0 to 15 may not reflect their real willingness.

..... [2]

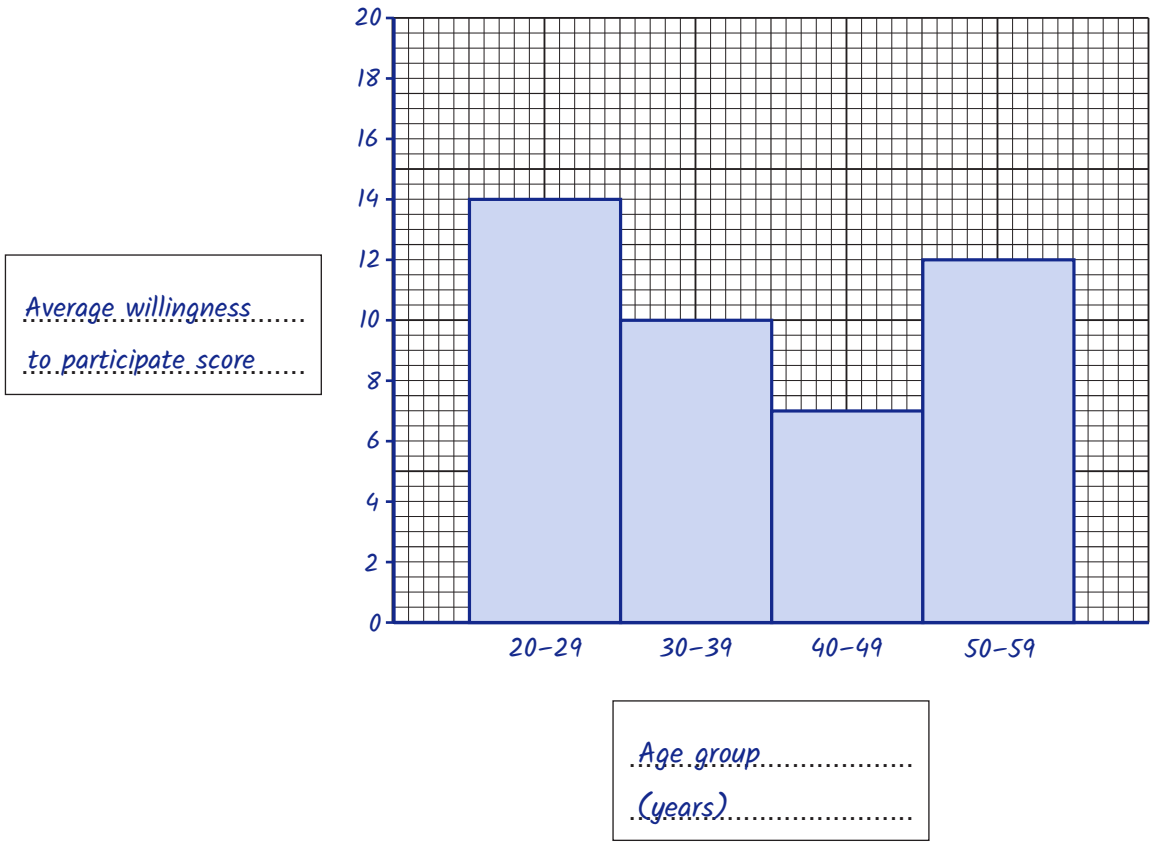
stemup.co.uk

(c) When Dr Chand conducts his study, he gives each adult a score out of 15 for how much they want to participate in social activities. He divides the adults into four different age groups and finds an average willingness to participate score for each group. These averages are shown in Table 8.1.

Table 8.1

	age groups (years)			
	20–29	30–39	40–49	50–59
average willingness to participate score	14	10	7	12

Plot a suitable graph of Dr Chand's data. You **must** label the axes.



[4]

DO NOT WRITE IN THIS MARGIN
DO NOT WRITE IN THIS MARGIN
DO NOT WRITE IN THIS MARGIN
DO NOT WRITE IN THIS MARGIN
DO NOT WRITE IN THIS MARGIN

Section B

Answer **all** questions.

9 Dr Gul is investigating whether people focus their attention more on brightly coloured advertisements than on less brightly coloured advertisements. He is planning to conduct a field experiment on a train.

(a) Describe how Dr Gul could conduct a field experiment to investigate the effect of colour brightness on how much train passengers focus their attention on advertisements.

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

The IV is the colour brightness of the advertisement. In the bright condition the advert uses vivid colours (e.g. bright red and yellow); in the dull condition the identical advert, with the same size, picture, words and product, is printed in pale, muted colours (e.g. grey and beige). Each advert is an A2 poster fixed at eye level opposite the seats in one carriage of a commuter train.

The design is independent measures: different passengers see the bright advert from those who see the dull advert, as the carriage shows only one version at a time. The version is alternated each day (bright on Monday, dull on Tuesday, and so on).

The DV is attention to the advert, recorded covertly by a researcher sitting in the carriage as an ordinary passenger. It is operationalised as the total number of seconds each passenger looks directly at the advert between two set stations (a 10-minute journey), timed with a stopwatch, plus the number of separate glances. A second observer records the same passengers to check inter-observer reliability.

Controls: the same route and carriage are used at the same time of day (8 am), so passenger numbers and lighting are similar; the advert is always in the same position with no other adverts in the carriage; and only passengers seated facing the advert are timed. The mean looking time is then compared for the bright and dull adverts.

..... [10]

DO NOT WRITE IN THIS MARGIN
DO NOT WRITE IN THIS MARGIN
DO NOT WRITE IN THIS MARGIN
DO NOT WRITE IN THIS MARGIN
DO NOT WRITE IN THIS MARGIN

(b) Explain **two** strengths of the study you described in part **(a)**.

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

1) High ecological validity: it is a field experiment on a real train and passengers do not know they are being observed, so their attention to the adverts is natural, with no demand characteristics, and the results reflect how people really respond to adverts.

2) The DV is operationalised objectively as seconds spent looking at the advert, timed with a stopwatch and checked by a second observer, so the data are quantitative and reliable and the means for bright and dull adverts can easily be compared.

..... [4]

DO NOT WRITE IN THIS MARGIN
DO NOT WRITE IN THIS MARGIN
DO NOT WRITE IN THIS MARGIN
DO NOT WRITE IN THIS MARGIN
DO NOT WRITE IN THIS MARGIN



BLANK PAGE

DO NOT WRITE IN THIS MARGIN
DO NOT WRITE IN THIS MARGIN
DO NOT WRITE IN THIS MARGIN
DO NOT WRITE IN THIS MARGIN
DO NOT WRITE IN THIS MARGIN



stemup.co.uk

BLANK PAGE

DO NOT WRITE IN THIS MARGIN
DO NOT WRITE IN THIS MARGIN
DO NOT WRITE IN THIS MARGIN
DO NOT WRITE IN THIS MARGIN
DO NOT WRITE IN THIS MARGIN

Permission to reproduce items where third-party owned material protected by copyright is included has been sought and cleared where possible. Every reasonable effort has been made by the publisher (UCLES) to trace copyright holders, but if any items requiring clearance have unwittingly been included, the publisher will be pleased to make amends at the earliest possible opportunity.

To avoid the issue of disclosure of answer-related information to candidates, all copyright acknowledgements are reproduced online in the Cambridge Assessment International Education Copyright Acknowledgements Booklet. This is produced for each series of examinations and is freely available to download at www.cambridgeinternational.org after the live examination series.

Cambridge Assessment International Education is part of Cambridge Assessment. Cambridge Assessment is the brand name of the University of Cambridge Local Examinations Syndicate (UCLES), which is a department of the University of Cambridge.

© UCLES 2025

stemup.co.uk

Cambridge Assessment International Education

Cambridge International AS & A Level

CANDIDATE NAME: StemUp Model Solution

CENTRE NUMBER | | | | | |

CANDIDATE NUMBER | | | | |

2140167450

PSYCHOLOGY **9990/23**

Paper 2 Research Methods **October/November 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.
- Do **not** write on any bar codes.

INFORMATION

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

This document has **12** pages. Any blank pages are indicated.

© UCLES 2025

[Turn over

stemup.co.uk

Section A

Answer **all** questions.

1 **(a)** Define what is meant by 'counterbalancing'.

Two groups do the conditions in opposite orders: one group does condition A then B, the other does B then A (ABBA). [1]

(b) Outline **one** reason why counterbalancing is important in experiments.

To reduce order effects such as practice or fatigue, by balancing them across the conditions. [1]

2 State whether the hypothesis, 'attention will be better when eating than when not eating' is a:

- directional hypothesis
- non-directional hypothesis
- null hypothesis.

Directional hypothesis.

..... [1]

3 In the study by Fagen et al. (elephant learning), there were several stages to the training process.

(a) Explain why there was no fixed length of time for the elephants' training.

Because of individual differences; each elephant learned at a different rate and had different needs, e.g. one had to be retrained because she preferred saline to water, so the trainers, who knew their elephants, tailored the training time to each one.

..... [2]

(b) Some behavioural tasks were more difficult than others for the elephants to learn. This difference in difficulty was called 'relative difficulty' in the study.

Explain how Fagen et al. measured relative difficulty.

By counting the total number of offers (cues) that had to be given before each elephant passed the behavioural test for a task, then taking the average of these totals for all the elephants. More offers meant the task was more difficult.

..... [2]

DO NOT WRITE IN THIS MARGIN

DO NOT WRITE IN THIS MARGIN
DO NOT WRITE IN THIS MARGIN
DO NOT WRITE IN THIS MARGIN
DO NOT WRITE IN THIS MARGIN
DO NOT WRITE IN THIS MARGIN

4 Hölzel et al. (mindfulness and brain scans) measured changes in mindfulness using the 39-item five facet mindfulness questionnaire (FFMQ).

(a) Explain **one** strength of measuring the change in mindfulness in this way.

The FFMQ gives quantitative scores, so mindfulness before and after the 8-week MBSR course can be compared easily and objectively to see if it rose. It also has high internal reliability, as scores on the five subscales are consistent with each other.

..... [2]

(b) Explain **one** weakness of measuring the change in mindfulness in this way.

It is a self-report questionnaire, so participants might give socially desirable answers, e.g. reporting more mindfulness after the course because they think that is expected, so the scores may not show their real mindfulness, lowering validity.

..... [2]

5 In the study by Piliavin et al. (subway Samaritans), there were two types of victim who collapsed on the train.

(a) Describe **three** ways that the two types of victim differed.

1) One victim acted drunk, whereas the other acted ill.

2) The drunk victim carried a bottle in a brown paper bag, whereas the ill victim carried a black cane.

3) The drunk victim smelled of alcohol (liquor), whereas the ill victim appeared sober.

..... [3]

(b) Explain why it was important that there were also similarities between the two types of victim.

It was a control (standardisation) to limit confounding variables. Both victims were males aged 26 to 35, dressed the same (Eisenhower jacket, old slacks, no tie) and collapsed in the same way about 70 seconds after the train left the station. So the victims looked like ordinary passengers and any difference in helping could only be due to the IV, whether the victim was ill or drunk, not to differences in how the victims looked or behaved. ..... [3]

6 Describe open questions and closed questions, using any example(s).

Open questions allow participants to answer freely in their own words rather than choosing from fixed options. They produce detailed, qualitative data that gives insight into reasons for behaviour, but the answers must be interpreted by the researcher, which can be subjective. For example, "Describe how you feel in a crowded place." In Dement and Kleitman's study, participants woken from sleep were asked to describe the content of their dream. Closed questions only allow participants to choose from a limited number of options, such as yes/no or a rating scale. They produce quantitative data that is easy to analyse and more objective, but people may be forced to choose an answer that does not fit. For example, "How stressed do you feel on a scale of 1 to 10?" In Baron-Cohen et al.'s Eyes Test, participants chose one of four words to describe what the person in each photo was thinking or feeling.

..... [6]

7 Pedro is conducting a study about children's interest in different types of objects. He has objects for children to explore, including picture books and toy bricks. Pedro is recording which objects children choose and for how long they interact with those objects.

(a) (i) Pedro wants to add more objects and is considering plush (soft) toys, wheeled toys, noisy toys and balls.

Explain why **two** of these objects could interest children. Your two answers **must** be different.

1) Plush toys: they are soft and warm, so children may like to cuddle them for comfort.

2) Noisy toys: their sounds make them more stimulating than silent toys, so they catch children's attention. ..... [2]

(ii) Suggest **one** reason why **one** of the objects named in part **(a)(i)** may not interest the children.

Noisy toys may not interest some children, because they may be frightened by sudden loud noises, so they would not go near them.

..... [2]

DO NOT WRITE IN THIS MARGIN

DO NOT WRITE IN THIS MARGIN
DO NOT WRITE IN THIS MARGIN
DO NOT WRITE IN THIS MARGIN
DO NOT WRITE IN THIS MARGIN
DO NOT WRITE IN THIS MARGIN

(b) Suggest how Pedro could tell the children that they have the right to withdraw from his study in a way that they will understand.

Pedro could say: "You don't have to stay and play with the toys if you don't want to. You can stop playing and go back to your mum or dad whenever you like, and that's fine."

..... [2]

(c) Pedro tests two children using a choice of picture books, toy bricks and one other object. He collects data about how long each child interacts with the objects.

Draw a table that Pedro could use to collect this data. You **must** label the rows and columns of your table.

Object	Duration of interaction (seconds)	
	Participant 1	Participant 2
Picture books		
Toy bricks		
Plush toy		

[3]

8 Dr Bakar is investigating the effect of boredom on people's estimation of time. Her participants were separated into two groups and did different activities:

- Group A watched an exciting film (non-boring activity)
- Group B moved small boxes from one pile to another (boring activity).

Both activities lasted 30 minutes. Each participant was asked to estimate how long the activity had lasted.

(a) Outline the dependent variable in Dr Bakar's study.

The DV is the participants' estimation of time: how long (in minutes) each participant estimates the 30-minute activity lasted.

[2]

(b) Dr Bakar is concerned about possible differences between individuals in Group A and Group B that could affect the validity of her study.

(i) Suggest why **two** possible differences between individuals in Group A and Group B could lower validity.

difference 1 *Some people in Group A may watch a lot of films and enjoy them, so they get absorbed and time seems to pass faster, making their estimates shorter because of film interest, not boredom.*

difference 2 *Some people are naturally better at judging time. If more of these were in one group, the groups' estimates would differ because of timing ability, not because of the IV.*

[4]

(ii) For **one** of the differences you suggested in part **(b)(i)**:

Suggest how Dr Bakar could change her study to improve validity.

For difference 2: give everyone a timing test first (e.g. estimating a 5-minute period), then use matched pairs, putting one of each pair with similar timing ability in each group, so any difference is due to the activity, not timing ability.

[2]

DO NOT WRITE IN THIS MARGIN

(c) Dr Bakar includes a control group in her study.

(i) Suggest a suitable control group for Dr Bakar's study.

A group who sit quietly in the same room for 30 minutes with no activity.

..... [1]

(ii) Explain why the control group you suggested in part **(c)(i)** is suitable.

It gives a baseline time estimate with no activity, to compare with the exciting (Group A) and boring (Group B) conditions. [1]

DO NOT WRITE IN THIS MARGIN
DO NOT WRITE IN THIS MARGIN
DO NOT WRITE IN THIS MARGIN
DO NOT WRITE IN THIS MARGIN
DO NOT WRITE IN THIS MARGIN

9 Daniel is investigating the effect of childhood experiences on adult food preferences. He asked adult participants to taste one food item. He counted the number of participants who liked this food item who had:

- a positive childhood experience of that food item
- a negative childhood experience of that food item
- no childhood experience of that food item.

(a) A graph of Daniel's results is shown in Fig. 9.1.

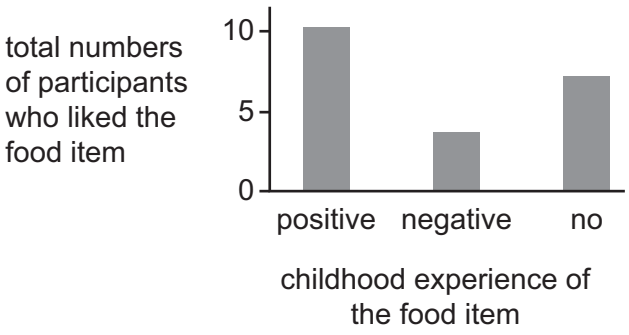


Fig. 9.1

(i) Name the type of graph in Fig. 9.1.

Bar chart (bar graph). [1]

(ii) Suggest **one** conclusion from Daniel's results.

Positive childhood experiences of a food increase how much adults like it later, and negative experiences decrease liking. [1]

(b) Suggest **one** problem with validity that Daniel may have because he is only using adults in his study, other than generalisability.

Adults may not accurately remember their childhood experiences of the food, so they may forget positive or negative experiences or report ones they did not have. So participants may be put in the wrong category, lowering validity.

[2]

DO NOT WRITE IN THIS MARGIN

DO NOT WRITE IN THIS MARGIN
DO NOT WRITE IN THIS MARGIN
DO NOT WRITE IN THIS MARGIN
DO NOT WRITE IN THIS MARGIN
DO NOT WRITE IN THIS MARGIN

Section B

Answer **all** questions.

10 Liam is a young man who is unusually good at focussing his attention on many types of stimuli, such as sights or sounds.

(a) Describe how a researcher could conduct a case study to investigate Liam's unusual ability to focus his attention.

Do **not** describe ethical issues / guidelines in your answer.

The case study is of Liam, a young man (e.g. aged 22) referred by his university tutor because of his unusual ability to focus. Background information is collected first: his age, education, job, hobbies (e.g. video games or a musical instrument) and any history of attention problems in his family.

Liam is studied over 6 months using several techniques. First, a semi-structured interview with Liam, e.g. "Describe what happens in your mind when you focus on a sound" and "On a scale of 1 to 10, how easily are you distracted by noise?". Second, interviews with his parents and teachers about when his ability first appeared. Third, standardised attention tasks: a visual task (spotting a target letter in a grid on a screen) and an auditory task (pressing a button whenever a set tone is heard), both with and without background chatter as a distraction. His accuracy (% correct), reaction time (ms) and how long he stays focused before his first error are recorded. The tasks are repeated each month and for longer periods, to see whether boredom or tiredness affects his attention. Fourth, an observation of him studying, counting how often he looks away from his work in 30 minutes.

Analysis: his task scores are compared with the mean scores of people of his age and sex. The interview data are analysed for themes, e.g. strategies he uses to focus. The results from all the techniques are triangulated to check that they agree.

[10]

(b) Explain how **two** features of the procedure you described in part **(a)** help to make the study valid.

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

1) Triangulation: data from the interviews with Liam, his parents and teachers, the tasks and the observation are compared. If they all show the same exceptional focus, the conclusion is more likely to be true and not due to, e.g., Liam exaggerating in his interview.

2) Operationalisation: attention is measured objectively as accuracy and reaction time on standardised tasks, with the same distractions each time, so the researcher is really measuring attention and the scores can be compared with others of his age.

..... [4]

DO NOT WRITE IN THIS MARGIN
DO NOT WRITE IN THIS MARGIN
DO NOT WRITE IN THIS MARGIN
DO NOT WRITE IN THIS MARGIN
DO NOT WRITE IN THIS MARGIN



BLANK PAGE

DO NOT WRITE IN THIS MARGIN
DO NOT WRITE IN THIS MARGIN
DO NOT WRITE IN THIS MARGIN
DO NOT WRITE IN THIS MARGIN
DO NOT WRITE IN THIS MARGIN



stemup.co.uk

BLANK PAGE

DO NOT WRITE IN THIS MARGIN
DO NOT WRITE IN THIS MARGIN
DO NOT WRITE IN THIS MARGIN
DO NOT WRITE IN THIS MARGIN
DO NOT WRITE IN THIS MARGIN

Permission to reproduce items where third-party owned material protected by copyright is included has been sought and cleared where possible. Every reasonable effort has been made by the publisher (UCLES) to trace copyright holders, but if any items requiring clearance have unwittingly been included, the publisher will be pleased to make amends at the earliest possible opportunity.

To avoid the issue of disclosure of answer-related information to candidates, all copyright acknowledgements are reproduced online in the Cambridge Assessment International Education Copyright Acknowledgements Booklet. This is produced for each series of examinations and is freely available to download at www.cambridgeinternational.org after the live examination series.

Cambridge Assessment International Education is part of Cambridge Assessment. Cambridge Assessment is the brand name of the University of Cambridge Local Examinations Syndicate (UCLES), which is a department of the University of Cambridge.

© UCLES 2025

stemup.co.uk