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CANDIDATE NAME: StemUp Model Solution

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PSYCHOLOGY **9990/21**

Paper 2 Research Methods **May/June 2022**

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 in this section.

1 From the study by Bandura et al. (aggression):

(a) Describe how the quantitative data was collected in this study.

The children were watched through a one-way mirror for 20 minutes. Observers recorded their behaviour every 5 seconds using behavioural categories such as imitative physical aggression (e.g. hitting the Bobo doll with the mallet), so the number of aggressive acts was counted. [2]

(b) Suggest **one** advantage of using quantitative data in this study.

Numbers can be analysed statistically and objectively, so the researchers could compare the mean number of imitative aggressive acts of children who saw the aggressive model with those who saw the non-aggressive model, and of boys with girls. [2]

2 A study has the experimental hypothesis 'Older people will forget more often than younger people'. This is a 'directional hypothesis' rather than a 'non-directional hypothesis'.

Explain what makes this a 'directional hypothesis'.

It predicts which group will forget more: older people are expected to forget more often than younger people. A non-directional hypothesis would only say that the two age groups will differ in how often they forget, without saying which will forget more. [2]

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3 A problem in experimental studies is the presence of uncontrolled variables. One uncontrolled variable in the study by Andrade (doodling) was how likely each participant was to daydream.

(a) Describe what is meant by an 'uncontrolled variable'.

A variable other than the IV that has not been controlled or eliminated, so it could affect the DV. [1]

(b) Explain why the uncontrolled variable of daydreaming was a problem in this study.

Participants who daydream more would pay less attention to the phone message, so they would recall fewer names and places. If there were more daydreamers in one condition, differences in recall could be due to daydreaming rather than doodling, so the effect of the IV is hidden and validity is lowered. [2]

4 A correlational study tested the idea that the amount of time spent using a phone is linked to quality of sleep.

(a) **(i)** State the relationship between the variables measured in this study, if a positive correlation was found.

The more time people spend using their phone, the better their quality of sleep.

..... [1]

(ii) State the relationship between the variables measured in this study, if a negative correlation was found.

The more time people spend using their phone, the worse their quality of sleep.

..... [1]

(b) Suggest **one** reason why it was more appropriate to conduct a correlational study rather than an experiment to test this idea.

It would be unethical to manipulate phone use, e.g. making people use their phone for hours before bed, because it could worsen their sleep and break the guideline of protection from harm. Measuring people's normal phone use and sleep quality and correlating them causes no harm. [2]

5 In the study by Piliavin et al. (subway Samaritans), one way that data was collected was by listening to the comments made by subway passengers. Differences were reported in relation to the type of victim the comments referred to.

(a) Describe **one** of these differences.

There was a difference in the comments made about the drunk victim and the victim with a cane: more comments were made by passengers when the victim appeared drunk than when he carried a cane.

..... [2]

(b) Suggest **one** problem the observers could have had when listening to the comments made by subway passengers.

The carriage was noisy and the observers could not write openly, so they may have misheard or misremembered comments. ..... [1]

6 Describe what is meant by a 'semi-structured interview' and an 'unstructured interview', using any examples.

A semi-structured interview has some set questions that are asked to every participant, but the interviewer can also add extra questions in response to the participant's answers. For example, Schachter and Singer asked participants a standard question such as "How are you feeling?" and could then follow up. Another example is a teacher asking every student the same five questions about revision, then asking "Why?" after interesting answers. An unstructured interview is much more flexible: there may be only a topic, and the interviewer asks new questions depending on what the participant says, mostly open questions, so it produces detailed qualitative data. For example, Dement and Kleitman sometimes went into the participant's room to ask more questions about a particular part of their dream. In Piliavin et al, the observers also spoke to the passengers next to them to elicit comments about the incident.

..... [6]

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Section B

Answer **all** questions in this section.

7 Rhiain is investigating how much time babies spend in REM sleep. She thinks that bigger babies will spend more time in REM sleep than smaller babies.

(a) State the aim of Rhiain's study.

To investigate whether bigger babies spend more time in REM sleep than smaller babies. [1]

(b) One technique that Rhiain could use to measure REM sleep duration is an EEG (electroencephalograph).

(i) Suggest **one** disadvantage of using this technique in Rhiain's study.

The electrodes attached to the baby's scalp could be uncomfortable or distressing. Babies cannot ask to withdraw, they can only cry, and the discomfort could wake them, so the REM sleep times recorded would be inaccurate. [2]

(ii) Suggest why using **one** other technique to measure REM sleep duration would be more appropriate in this study.

Rhiain could video the babies with an infra-red camera while they sleep in their own cots and time how long rapid eye movements can be seen behind their eyelids. Nothing is attached to the baby's head, so it causes no distress and the babies sleep normally in a familiar place. This makes the REM durations more valid, and the videos can be re-watched by a second observer to check reliability. [3]

(c) Rhiain also wants to know whether babies who are in REM sleep are having dreams but the babies cannot answer questions about the content of their dreams.

Suggest how Rhiain could observe the babies during REM sleep to investigate the content of their dreams.

She could video the babies' faces during REM sleep and record the direction of their eye movements and facial expressions such as smiling or frowning. Eyes moving from side to side might suggest they are watching something in the dream, and a smile might suggest a happy dream. [2]

8 Kylo is planning a case study to investigate the importance of a pet/domesticated animal in the life of an elderly person.

(a) When choosing his sample of one elderly person he has several decisions to make.

Suggest who Kylo should look for as a participant, including:
- the pet/domesticated animal they have and why the elderly person has this animal
- **one** other decision he must make when choosing his participant.

Do **not** refer to sampling techniques in your answer.

Kylo should look for a woman over 75 who has a pet dog. She adopted the dog for companionship after her husband died, and walking it every day gets her out of the house and keeps her fit. Another decision is whether the participant lives alone: Kylo should choose someone who lives alone, because the animal is then likely to be their main company, like family, so its importance in their life will be clearer and not mixed up with the effect of other people in the house.

[4]

(b) (i) Suggest **one** technique Kylo could use to collect data from his participant in his case study.

An unstructured interview in the participant's home, which is audio-recorded. Kylo would start with a few open questions and then follow up on her answers with new questions, for example "Describe a typical day with your dog" and "How would your life change if you did not have him?". This gives detailed qualitative data about the importance of the dog in her life.

..... [3]

(ii) Explain **one** advantage of the technique you suggested in **(b)(i)**.

Kylo can ask about the reasons behind her behaviour with the dog, e.g. why she talks to him, and about her feelings, such as loneliness. These cannot be seen in an observation, so he gains in-depth, detailed data.

..... [2]

(iii) Explain **one** disadvantage of the technique you suggested in **(b)(i)**.

She may give socially desirable answers, e.g. hiding how much she talks to the dog or depends on him because she is embarrassed. This would make the data about the importance of the dog less valid.

..... [2]

9 Rory is investigating factors that affect feeding behaviour in animals.

(a) Rory has chosen to observe the feeding behaviour of some fish.

Suggest **one** problem Rory could have when observing these fish.

The fish may swim quickly or behind plants and around each other, so it is hard to see which fish are feeding. [1]

(b) Rory will keep these fish in a container filled with water.

Suggest **one** other feature related to 'housing' that Rory should consider.
Do **not** refer to feeding in your answer.

The size of the tank; it must give enough space and water for the number of fish so they can swim freely and are not overcrowded, otherwise they could be distressed and become aggressive towards each other. [2]

(c) Explain why using fish will limit the generalisability of Rory's findings.

Fish are very different from humans and other mammals; they have simpler brains, learn less and live in water. So factors affecting their feeding behaviour may not apply to more intelligent, land-living species such as humans. [2]

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Section C

Answer **all** questions in this section.

10 Gareth wants to investigate whether people are more friendly to each other after a positive public event, for example, a festival or a celebrity wedding.

(a) Design a natural experiment to test whether a positive public event makes people more friendly to each other. You may use any positive public event.

Aim: to see whether people are more friendly to each other after a positive public event. The event is a large city festival, e.g. a carnival held every year on one weekend. The IV occurs naturally and is not manipulated; friendliness is measured one week before the festival and on the day after it. Hypothesis: people will show more friendly behaviours after the festival than before it.

Where: the main entrance of a busy supermarket in the city centre near the festival site. Two observers sit at a café table opposite the doors, looking like customers, so this is a covert, non-participant, naturalistic observation.

DV: friendliness is operationalised using behavioural categories: holding the door open for another person, smiling at a stranger, saying "thank you" or greeting someone, and stopping to help someone, e.g. picking up something they dropped. Each observer uses event sampling, tallying every time one of these behaviours occurs.

Who: an opportunity sample of the first 200 adults who go through the doors in each session.

Controls: both sessions are on the same weekday (a Monday), at the same time (10:00 to 12:00), at the same location, using the same observers and categories. The observers are trained beforehand with the same definitions, and their tallies are compared to check inter-rater reliability.

Ethics: this is a public place where people expect to be seen, no names or photographs are taken, so privacy and confidentiality are kept, and the supermarket manager gives permission.

Analysis: the total number of friendly behaviours in each category is calculated for before and after the festival, the mean per 100 people is found, and the results are

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shown in a bar chart to compare friendliness before and after.

[10]

(b) Identify **one** practical weakness/limitation with the procedure you have described in your answer to part **(a)** and suggest how your study might be done differently to overcome the problem.

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

Weakness: other situational variables may differ between the two days, e.g. the weather may be sunny before the festival but rainy afterwards, and people in a rush in the rain may hold doors and smile less. So any difference in friendliness may not be caused by the festival, lowering validity.

Improvement: observe on three days before and three days after the festival and only use days with similar weather. Gareth could also observe at the same times in a similar town with no festival, as a comparison, so any extra increase in friendliness after the festival is more likely to be due to the event. [4]

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CANDIDATE NAME: StemUp Model Solution

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PSYCHOLOGY **9990/22**

Paper 2 Research Methods **May/June 2022**

1 hour 30 minutes

You must answer on the question paper.

You will need: Ruler

INSTRUCTIONS

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Section A

Answer **all** questions in this section.

1 State what is meant by 'reliability'.

Consistency of a measure: it gives the same results each time it is used in the same way.

..... [1]

2 Explain the difference between 'qualitative data' and 'quantitative data'.

Quantitative data is numerical, e.g. scores or the number of times a behaviour occurs.

Qualitative data is descriptive, in words, giving depth and detail, e.g. a participant's description of how they feel.

..... [2]

3 Schachter and Singer (two factors in emotion) was a laboratory experiment.

(a) The participants in this study were all male. A new experiment could explore gender differences in the effect of epinephrine. However, the stooge may influence emotions differently in males and females.

Suggest how a difference between the influence of the stooge on males and females could affect the results about gender differences in the effect of epinephrine.

The angry stooge might make females angrier than he made males. So females would appear to be more affected by the epinephrine than males even if the drug had the same effect on both, giving a false gender difference.

..... [2]

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(b) A second new experiment could include a stooge who claims to feel ill because of the injection.

(i) Suggest how **one** participant variable could affect the results of this second new experiment.

Anxiety about injections: more anxious participants, or those who already felt a little unwell, might be more affected by the ill stooge and report feeling more ill, so the effect of the stooge would look greater than it really is.

..... [2]

(ii) Explain **one** ethical problem with this second new experiment.

Participants would believe the stooge really is ill because of the injection that they also received, so they would be deceived and worried that they will become ill too. This is distressing, so they are not protected from psychological harm.

..... [2]

4 In the study by Baron-Cohen et al. (eyes test), eight problems of validity were identified with the original version of the eyes test. Two of these problems were that:

- the task involved a forced choice between only two response options (the two words presented)
- the test included basic mental states.

(a) Explain why each of these problems affected the validity of this study.

the task involved a forced choice between only two response options *with only two words participants had a 50% chance of being correct on each item just by guessing, so their score did not validly measure their real ability to recognise mental states from the eyes.*

the test included basic mental states *basic emotions such as happy or sad were too easy, so almost everyone scored highly (a ceiling effect) and the test could not discriminate between people with good and poor ability to read mental states.*

[4]

(b) Explain how solving **one** of these problems improved the validity of the eyes test.

The revised Eyes Test gave four words to choose from for each pair of eyes, so the chance of guessing correctly fell to 25%. This means the scores reflect actual ability to detect mental states, giving a wider and more valid range of scores.

[2]

5 In the study by Milgram (obedience), the sample included a range of occupations.

Name **two** of these occupations.

1 *High school teachers*

2 *Postal clerks*

[1]

6 Describe the use of 'open questions' and 'closed questions' in research, using any examples.

Open questions let participants answer freely in their own words, so they produce detailed qualitative data, but this is harder to analyse and more subjective. For example, Dement and Kleitman asked participants who had been dreaming to describe the content of their dream into a recording device. Another example is "How do you feel when you are revising for exams?". Closed questions give participants a fixed set of answers to choose from, so they produce quantitative data that is objective and easy to compare and analyse, although participants may not find an option that matches their true view. For example, Dement and Kleitman first asked participants to state whether or not they had been dreaming. In Canli et al. participants rated how emotionally intense each picture was on a scale from 0 (not emotionally intense at all) to 3 (extremely emotionally intense) by pressing buttons.

[6]

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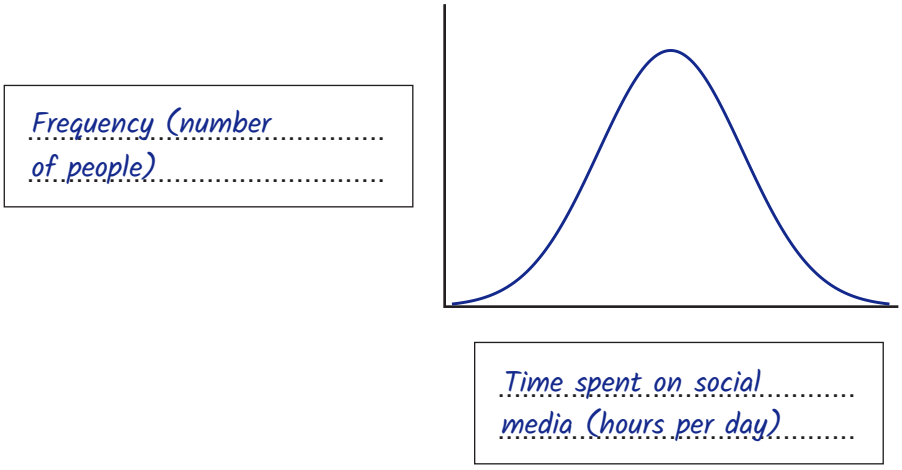
Section B

Answer **all** questions in this section.

7 Geoffrey is conducting structured interviews about people's use of social media. He is investigating how much time people spend on social media and how positive they feel about it.

(a) Geoffrey finds that the time participants spend on social media is normally distributed.

Sketch the shape of this normal distribution using the axes below. You **must** label the axes.



[3]

(b) Geoffrey finds that some participants give interesting responses, but he does not explore their use of social media further.

(i) Explain **one** practical reason why using a structured interview means that Geoffrey **cannot** explore these participants' use of social media further.

In a structured interview Geoffrey has to ask the same fixed questions in the same order to everyone, so he cannot add follow-up questions, and his set questions may not cover the interesting issue the participant raised.

[2]

(ii) Explain **one** ethical reason why Geoffrey may choose **not** to explore these participants' use of social media further.

Privacy: participants may not want to talk about their personal lives in more detail. For example, they might be using social media for reasons they are embarrassed about, or posting things they do not want anyone to know about. Asking more questions could make them uncomfortable and distressed, so to protect them from harm Geoffrey should not probe further.

[3]

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Question 8 appears on the next page.

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8 Faolan is investigating teachers' attitudes and behaviours towards students doodling. She has conducted a semi-structured interview and has observed the teachers in the classroom.

(a) (i) Faolan asks each teacher to rate how annoyed they feel when a student in their class doodles.

Suggest a scale that Faolan could use to measure how annoyed the teachers are.

1 = not at all annoyed to 10 = extremely annoyed.

..... [1]

(ii) Explain **one** problem with the scale that you have suggested in **(a)(i)**, including how this would affect the results.

Teachers may interpret the numbers differently; a "6" may mean quite annoyed for one teacher but hardly annoyed for another. So teachers with the same feelings could give different scores, and the results could not be validly compared. ..... [2]

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(b) Faolan is interested to know whether teachers show the same behaviours in the classroom when students doodle as they reported during the interview.

(i) Suggest **two** reasons why the teachers' interview responses may differ from their behaviour in the classroom. Your answers should **not** relate to the scale you suggested in **(a)(i)**.

1 *The teachers may not want to admit to Faolan how annoyed they get with doodling students, because it is socially undesirable, so in the interview they would under-estimate their annoyance compared with how they really behave in class.*

2 *Teachers might be in a different mood on the day they are observed, e.g. tired at the end of a long day, so they would be much more annoyed by doodling than usual and than they reported.*

[4]

(ii) If Faolan finds that teachers do not show the same behaviours in the classroom as they report during the interview, this raises an ethical issue.

Suggest why it could be difficult for Faolan to follow the ethical guideline of 'protection from harm' when she explains her results to the participants.

Teachers may be upset or embarrassed to learn they are harsher with doodling students than they thought. [1]

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9 Tulip is conducting a study on social behaviour in animals. She is investigating whether animals are more sociable when they are in a large laboratory cage or a small laboratory cage.

(a) Tulip has to decide which species to use.

Explain how **one** ethical guideline relating to animals would affect her decision.

Pain and distress: Tulip should use a species that will suffer least, e.g. rats rather than chimpanzees, because more intelligent animals are more likely to be distressed by being kept in a small laboratory cage.

..... [2]

(b) Tulip is finding a median. She puts her scores in order.

State what a researcher should do to find the median if there are two middle numbers.

Add the two middle scores together and divide the total by 2.

..... [1]

(c) Explain how Tulip would find the range of the number of sociable behaviours of the animals in the small cage.

Find the largest and the smallest number of sociable behaviours shown by an animal in the small cage, then subtract the smallest number from the largest number.

..... [2]

(d) Explain why it would be appropriate for Tulip to use counterbalancing if she chose a repeated measures experimental design.

In repeated measures each animal is tested in both cages, which causes order effects. For example, animals might be more used to the laboratory and to each other the second time, so they are more sociable in whichever cage came second, or more tired and less sociable. Counterbalancing (half the animals in the small cage first, half in the large cage first) balances out these order effects, so any difference in sociability is due to cage size. [3]

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Section C

Answer **all** questions in this section.

10 Enfys wants to investigate whether different types of shopper are more relaxed than others. For example, whether shoppers with trolleys/carts are more relaxed than shoppers with baskets.

(a) Describe how Enfys could conduct a natural experiment to investigate whether some types of shopper are more relaxed than other types of shoppers. You may choose to compare shoppers with trolleys/carts and baskets or any other different types of shopper.

Aim: to see whether shoppers with trolleys are more relaxed than shoppers with baskets. The IV is naturally occurring, as the shoppers choose a trolley or a basket themselves, so it is not manipulated. Hypothesis: shoppers with trolleys will show more relaxed behaviours than shoppers with baskets.

Where: a large supermarket. Two observers dressed as shop staff stack shelves in the same long aisle, so it is a covert, non-participant, naturalistic observation.

DV: how relaxed each shopper is, measured with behavioural categories. Relaxed: walking slowly, smiling, browsing products, chatting calmly. Tense: frowning, sighing, rushing, checking their watch or phone. Each shopper is observed for 1 minute using time sampling: every 10 seconds the observer ticks which category the shopper is showing, giving a relaxed score out of 6.

Who: an opportunity sample of adult shoppers who are shopping alone, the first 50 with a trolley and the first 50 with a basket who enter the aisle, so it is an independent measures design.

Controls: observations are made on weekdays at the same times (10:00 to 12:00 and 17:00 to 19:00) so busy and quiet times are equal for both groups. Both observers are trained with the same definitions and observe the same shoppers, so their scores can be correlated to check inter-rater reliability.

Ethics: the manager gives permission; the shop is a public place and no names or images are recorded, so the shoppers stay anonymous.

Analysis: the mean relaxed score for trolley shoppers and for basket shoppers is calculated and shown in a bar chart to see which type of shopper is more relaxed.

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..... [10]

(b) Identify **one** practical weakness/limitation with the procedure you have described in your answer to part (a) and suggest how your study might be done differently to overcome the problem.

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

Weakness: the behavioural categories may be interpreted differently by the two observers, e.g. one might record a shopper as "walking slowly" while the other records "rushing", so the tallies would have low inter-rater reliability.

Improvement: operationalise each category precisely, e.g. "rushing" means walking the 20-metre aisle in under 10 seconds, and train the observers with video clips of shoppers before the study. In a pilot study their scores would be correlated, and the categories adjusted until there is a high correlation, so both observers record behaviour consistently. [4]

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Cambridge Assessment International Education

Cambridge International AS & A Level

CANDIDATE NAME: StemUp Model Solution

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PSYCHOLOGY **9990/23**

Paper 2 Research Methods **May/June 2022**

1 hour 30 minutes

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Section A

Answer **all** questions in this section.

1 In the study by Andrade (doodling), parts of the procedure helped to reduce demand characteristics.

Describe **two** parts of the procedure that helped to reduce demand characteristics in this study.

1 *Independent measures design: each participant was only in the doodling or the non-doodling condition, so they could not compare the conditions and guess that the study was about the effect of doodling.*

2 *Participants were only told to write down the names of people coming to the party, so the test of recall (especially of the places) was a surprise. Participants did not know their memory was being tested, so they could not try harder to remember.*

[4]

2 **(a)** State the difference between an 'aim' and a 'hypothesis'.

An aim is a general statement of the purpose of a study, whereas a hypothesis is a precise, testable prediction. [1]

(b) A non-directional hypothesis for a study states that 'Boys and girls differ in how aggressive they are' but the researcher has decided to use a directional hypothesis instead.

Suggest a directional hypothesis for this study.

Boys will be more aggressive than girls.

[1]

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3 The study by Milgram (obedience) was not an experiment because there was no independent variable. Milgram later compared the results of this study to the findings of the same procedure carried out in an old office block. This comparison was an experiment.

(a) State the independent variable in this experiment.

The location: the prestigious Yale University laboratory or a run-down office block.

..... [1]

(b) State the dependent variable in this experiment.

The level of obedience: the percentage of participants who gave the maximum 450 V shock. ..... [1]

4 **(a)** Explain what is meant by the ethical guideline of 'species and strain' in relation to animals in psychological research.

Researchers should choose the species and strain of animal that will suffer the least pain and distress, while still being suitable for the purpose of the research, so that the study can still answer its research question.

..... [2]

(b) Describe how the ethical guideline of 'housing' affects what psychologists should and should not do when studying animals.

Psychologists should house animals in conditions that meet the needs of their species, age and sex: enough space to move and exercise, with no overcrowding, suitable warmth, cover and nesting material so they feel safe. Social species should be kept with others of their kind and not alone. They should not house animals near their natural predators, where they could be distressed, and should not clean cages too often, as the change of smell can upset them. ..... [3]

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5 In the study by Schachter and Singer (two factors in emotion), the placebo condition was a control condition.

(a) Outline what is meant by a 'control condition'.

A condition in an experiment in which the IV is absent, giving a baseline for comparison. [1]

(b) Explain the purpose of this control condition in this study.

The placebo group were injected with saline, not epinephrine, so they had no physiological arousal. This showed how participants would feel and behave with the euphoric or angry stooge without adrenaline, as a baseline to compare with the epinephrine groups. [2]

6 Describe 'random sampling' and 'volunteer sampling', using any examples.

In random sampling every member of the target population has an equal chance of being selected. The researcher needs a list of everyone in the population, e.g. all 600 students in a school, gives each a number and picks 30 numbers out of a hat or using a random number generator. This avoids researcher bias in who is chosen, but the people picked may refuse to take part. In volunteer sampling participants choose themselves by responding to a request, e.g. an advert in a newspaper, a poster, an email or an online post. For example, Milgram placed an advertisement in a local newspaper asking for men to take part in a study of memory at Yale University and paid them $4.50. Baron-Cohen et al. recruited adults with autism or Asperger syndrome through an advertisement in the National Autistic Society magazine and support groups. Volunteers may be more motivated or helpful than other people, so the sample may not be representative. [6]

Question 7 appears on the next page.

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Section B

Answer **all** questions in this section.

7 Mrs Colling is a headteacher/principal of a school and is planning an experiment to investigate whether rewards or punishments are best for improving students' learning. The independent variable is whether students receive rewards or punishments.

(a) (i) Suggest **two** ways that Mrs Colling could ask teachers to reward students in their classes.

1 *Giving merit points (stickers) for good work.*

.....

2 *Praising students verbally in front of the class.*

.....

[2]

(ii) Explain which of the ways you suggested in **(a)(i)** would be a more valid manipulation of the independent variable in this experiment.

Merit points, because each merit point is exactly the same for every student and teacher, so the reward is standardised. Praise varies, as some teachers praise warmly and others only briefly, so the IV would not be applied consistently.

..... [2]

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(b) Mrs Colling is talking to teachers about what punishment to use. Two suggested punishments are:

- missing breaktime every day for a week while standing outside the staffroom
- making the student write a public letter of apology to the school.

Both suggested punishments are rejected by the teachers for ethical and practical reasons.

(i) Suggest **one** ethical problem with **one** of these punishments.

The public letter of apology breaks confidentiality and could cause psychological harm, because everyone in the school would know the student had been punished, which could be very embarrassing and upsetting.

..... [2]

(ii) Suggest **one** practical problem with **one** of these punishments.

Missing breaktime every day while standing outside the staffroom would need a teacher to supervise, and students could be late for lessons, so they would get more punishments and miss learning, which would confound the results.

..... [2]

8 Ruby has conducted an experiment about language learning in animals using an animal called Delphine. Delphine has learned to make noises with different meanings. Ruby has tested Delphine's understanding of word types, including:

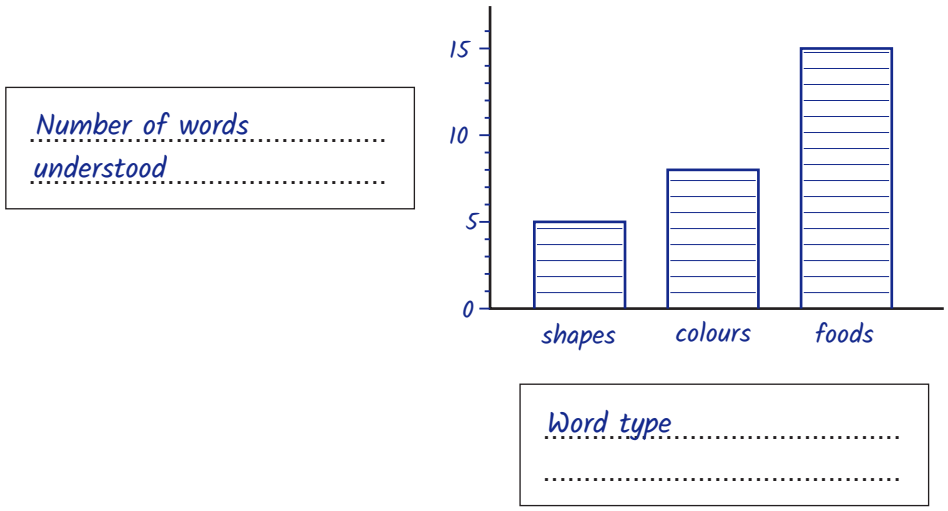
- shapes
- colours
- food types

(a) Ruby's results for the three word types are given in Table 8.1.

Table 8.1

Word type	shapes	colours	foods
Number of words understood	5	8	15

(i) Draw a bar chart of these results. You **must** label the axes.



[4]

(ii) State which measure of central tendency would be **most** appropriate for Ruby to use with this data.

The mode.

..... [1]

(b) Ruby plans to include two more word categories.

Explain why this would improve Ruby's results.

It would show whether Delphine's understanding applies to a wider range of word types, so the results are more generalisable. [1]

(c) Ruby is concerned that sometimes she will not hear Delphine's noises so wants to use a second observer to help her.

Outline **two** disadvantages of having a second observer.

1 *The second observer may hear or interpret Delphine's noises differently from Ruby, so there may be low inter-observer reliability.*

2 *The second observer would be unfamiliar to Delphine and might disturb or distract her, changing her responses.*

[2]

9 Dr Felix is conducting a natural experiment to test whether seeing television advertisements for a charity for older people makes participants behave more positively towards them. He measures this by giving a questionnaire about behaviour towards older people to a group of students. He gives the students the questionnaire one week before the advertisements appear on television and again the week after.

(a) Explain what is meant by a 'natural experiment', using this study as an example.

In a natural experiment the IV varies naturally and is not manipulated by the researcher. Here Dr Felix could not control when the charity adverts were shown on television; he could only measure behaviour the week before and the week after they appeared. [2]

(b) Suggest **one** problem with natural experiments, using this study as an example.

Fewer variables can be controlled, so we cannot be sure the IV caused any change. For example, the students may have become more positive because of something else that week, such as a news story about older people, and some may not have seen the adverts at all. [2]

(c) Dr Felix thinks it could be better to use covert observations rather than questionnaires to measure positive behaviour towards older people. He could have several older people as stooges, pretending to struggle with their shopping, and he could observe how the students behave.

(i) Suggest **one** advantage of using covert observation rather than questionnaires in this study.

The students would not know they were being observed, so there would be no social desirability or demand characteristics; their real helping behaviour towards the older stooges would be recorded, rather than them claiming on a questionnaire that they would behave positively. [2]

(ii) Suggest **one** disadvantage of using covert observation rather than questionnaires in this study.

The students could not give informed consent or withdraw, because they would not know they were being observed, whereas they can choose whether to complete a questionnaire. They might also be upset when they discover they were deceived by stooges. [2]

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Section C

Answer **all** questions in this section.

10 Jimmy wants to investigate individual differences in dreams. He is interested in many differences between participants, such as whether each individual:

- has consistent dream content
- has meaningful dreams
- dreams in colour.

(a) Describe how Jimmy could conduct a study using an interview to investigate at least two individual differences in dreams.

Aim: to investigate individual differences in whether people dream in colour and whether their dreams have consistent content. A semi-structured interview would be used, carried out face to face in a quiet room at a college, and audio-recorded so the answers can be transcribed.

Who: 20 adult volunteers who say they remember their dreams at least once a week, recruited with a poster in the college.

Procedure: each participant is given the same standardised instructions and told that they can skip any question and that their answers are confidential. The interviewer asks the same core questions in the same order, then can add follow-up questions about interesting answers.

Closed questions give quantitative data, e.g. "Do you dream in colour? Always / sometimes / never" and "How often do the same people or places appear in your dreams? Rate from 1 (never) to 5 (in nearly every dream)".

Open questions give qualitative data, e.g. "Describe the last dream you remember, including any colours you saw" and "Describe a theme that keeps coming back in your dreams". These follow the closed questions so the answers can be checked for consistency.

Filler questions, e.g. "What time do you usually go to bed?", are included so participants do not guess the aim and change their answers.

Analysis: the percentage of participants who dream in colour always, sometimes or never is shown in a bar chart, and the mean and range of the consistency ratings show how much people differ. The open answers are analysed into themes, e.g. "being

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chased" or "falling", to see which individuals have consistent dream content.

[10]

(b) Identify **one** practical weakness/limitation with the procedure you have described in your answer to part **(a)** and suggest how your study might be done differently to overcome the problem.

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

Weakness: participants have to remember their dreams from days or weeks ago, and dreams are quickly forgotten, so they may guess or make up details such as colours, or give socially desirable answers, so the data may not be valid.

Improvement: for a week before the interview each participant keeps a dream diary by their bed and writes down each dream, including any colours, as soon as they wake up. In the interview Jimmy asks his questions about these diary entries, so the answers are based on accurate, recent records of the dreams.

[4]

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