7.6 How to Write a Hypothesis

AQA 7182 · Calculator allowed · about 305 minutes

Total Marks

Name: _____ Date: ____ / ____ / _____

Answer every question in the spaces provided. Write in full sentences where a question asks you to explain, justify or discuss. Where a question asks you to write a hypothesis, write a single complete sentence. The marks available are shown in brackets after each question. This is a full question bank rather than a single sitting: work through it in sections, or use one of the timed cuts.

1 A social psychologist investigates conformity using a line judgement task. Participants give their answer either out loud in front of five confederates who have all given the same wrong answer, or privately by writing the answer on a card. The psychologist records how many of the eighteen critical trials each participant answers incorrectly. Identify the independent variable and the dependent variable in this study.

(Total for Question 1 is 2 marks)

2 A student is revising the features of a scientific hypothesis before an examination on research methods. Which one of the following is essential if a hypothesis is to be testable? Write the correct letter in your answer.

A It must predict the direction of the difference between the two conditions.
B It must be written in the null form before the study begins.
C Its variables must be stated in a form that can be measured or manipulated.
D It must be supported by at least two previous published studies.

(Total for Question 2 is 1 mark)

3 A psychologist investigates the capacity of short-term memory. Sixty adult volunteers are randomly allocated to one of two conditions. In the three-group condition each participant is read a string of twelve digits arranged as three groups of four; in the four-group condition the same twelve digits are read as four groups of three. Every participant then writes down as many digits as they can recall in the correct position. The psychologist records the number of digits recalled in the correct position out of twelve. No previous study has compared these two groupings directly, so the researcher cannot predict which will produce better recall.

Write a non-directional hypothesis for this study.

(Total for Question 3 is 3 marks)

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4 A psychologist is investigating whether the time of day affects reaction time. Previous studies on this question have produced conflicting findings. Which one of the following is a NON-DIRECTIONAL hypothesis? Write the correct letter in your answer.

A Participants tested at 9am will have a faster mean reaction time in milliseconds than participants tested at 4pm.

B To investigate whether the time of day at which a person is tested affects their reaction time.

C Participants tested at 4pm will have a faster mean reaction time in milliseconds than participants tested at 9am.

D There will be a difference in mean reaction time in milliseconds between participants tested at 9am and participants tested at 4pm.

(Total for Question 4 is 1 mark)

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5 A psychologist investigates whether physical attractiveness affects how much people are willing to disclose about themselves. Sixty adults each have a five-minute conversation with a partner who has been independently rated by a panel as either highly attractive or average in attractiveness. The number of personal facts each participant volunteers during the conversation is counted.

Erin writes the following hypothesis: 'Participants who talk to a highly attractive partner will volunteer more personal facts during the five-minute conversation than participants who talk to a partner of average attractiveness.'

State how many of the three available marks Erin would earn, and justify your answer.

(Total for Question 5 is 2 marks)

6 In a research methods lesson, a teacher writes two statements on the board about an investigation into helping behaviour on public transport. Explain the difference between the aim of an investigation and its hypothesis.

(Total for Question 6 is 2 marks)

7 A psychologist studying obedience writes the following statement before collecting any data: 'To find out whether the uniform worn by a person giving an instruction affects whether members of the public obey that instruction.' State whether this statement is an aim or a hypothesis, and justify your answer.

(Total for Question 7 is 2 marks)

8 A trainee researcher investigating memory writes the following statement before collecting any data: 'Participants who are tested in the same room in which they learned a word list will recall more words correctly out of 25 than participants who are tested in a different room.' State whether this statement is an aim or a hypothesis, and justify your answer.

(Total for Question 8 is 2 marks)

9 A psychologist investigates the capacity of short-term memory. Each participant is read a sequence of digits at a rate of one digit per second and then asked to write the sequence down in the correct order. The sequences increase in length from four digits to twelve digits. Half of the participants are tested in a silent room and half are tested while a recording of office noise is played. The psychologist records the longest sequence each participant recalls in the correct order. Identify the independent variable and the dependent variable in this study.

(Total for Question 9 is 2 marks)

10 A developmental psychologist observes infants aged between twelve and eighteen months during a brief separation from their caregiver in an unfamiliar playroom. Infants are placed into one of two groups according to whether a familiar toy from home is present or absent during the separation. An observer records the number of seconds each infant spends crying during a three-minute separation. Identify the independent variable and the dependent variable in this study.

(Total for Question 10 is 2 marks)

11 A psychologist plans to investigate whether stress affects immune function in undergraduate students. Her first draft of the independent variable reads simply 'stress'. Explain what is meant by operationalisation, and suggest how the independent variable 'stress' could be operationalised in this study.

(Total for Question 11 is 3 marks)

12 A psychologist plans to investigate whether taking handwritten notes rather than typed notes affects how well students learn from a lecture. Her first draft of the dependent variable reads simply 'how well students learn'. Suggest how this dependent variable could be operationalised, and explain why the version in her first draft could not be used.

(Total for Question 12 is 3 marks)

13 A student writes the following hypothesis for an experiment on caffeine and attention: 'Participants who drink a caffeinated drink will score higher on a sustained attention task.' A teacher marks this as worth fewer than full marks. Explain what is missing from this hypothesis and rewrite it so that both conditions of the independent variable are stated.

(Total for Question 13 is 3 marks)

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14 A psychologist investigates whether the type of feedback a learner receives affects how many practice attempts they make. Learners receive either written feedback on a printed sheet or spoken feedback from a tutor, and the psychologist counts how many practice attempts each learner completes in a thirty-minute session. Identify the independent variable and the dependent variable, and state whether each of them is fully operationalised as described.

(Total for Question 14 is 3 marks)

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15 A psychologist plans an experiment on whether listening to music while studying affects test performance. She finds that some previous studies report better performance with music and others report worse performance with music. Explain why a non-directional hypothesis would be appropriate for her study.

(Total for Question 15 is 2 marks)

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16 A psychologist plans an experiment on whether rehearsing a list of words aloud affects recall. Several well-controlled previous studies have all found that rehearsing aloud improves recall compared with rehearsing silently. Explain why a directional hypothesis would be appropriate for her study.

(Total for Question 16 is 2 marks)

17 A psychologist is preparing to investigate whether taking part in a six-week mindfulness course affects the number of hours of sleep adults report each night.

(a) Write a suitable aim for this investigation. **(2)**

(b) Explain why a researcher needs a hypothesis as well as an aim before beginning this investigation. **(2)**

(Total for Question 17 is 4 marks)

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18 A psychologist plans an experiment to test whether the number of bystanders present affects whether a person offers help. She intends to stage a situation in a shopping centre in which an actor drops a folder of papers, and to vary how many other shoppers are standing nearby.

(a) Suggest how the independent variable in this study could be operationalised. **(2)**

(b) Suggest how the dependent variable in this study could be operationalised. **(2)**

(c) State one reason why both variables must be operationalised before the study begins. **(1)**

(Total for Question 18 is 5 marks)

19 Three students each write a prediction for an investigation into whether playing a fast-paced video game affects heart rate.

Amelia writes: 'There will be a difference in mean heart rate in beats per minute between participants who play a fast-paced video game for fifteen minutes and participants who read a magazine for fifteen minutes.'

Kwame writes: 'To investigate whether playing a fast-paced video game affects heart rate.'

Niamh writes: 'Participants who play a fast-paced video game for fifteen minutes will have a higher mean heart rate in beats per minute than participants who read a magazine for fifteen minutes.'

(a) State which one of the three statements is an aim rather than a hypothesis. **(1)**

(b) Identify which of the two remaining statements is directional and which is non-directional, and justify your answer. **(2)**

(c) Explain why both Amelia's and Niamh's statements would be judged fully operationalised. **(2)**

(Total for Question 19 is 5 marks)

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20 A psychologist investigates the working memory model using a dual task procedure. Forty-eight participants each complete two conditions in a counterbalanced order. In the single task condition they track a moving dot on a screen for two minutes. In the dual task condition they track the same moving dot while simultaneously repeating the word 'Monday' aloud once per second. The psychologist records the number of seconds out of 120 for which the participant keeps the cursor on the dot. Previous dual task studies consistently find that adding a second task that uses a different slave system still reduces tracking accuracy slightly.

Write a directional hypothesis for this study.

(Total for Question 20 is 3 marks)

21 A psychologist investigates the effect of leading questions on eyewitness testimony. Eighty participants watch the same two-minute film of a collision between two cars. Half are then asked how fast the cars were going when they smashed into each other, and half are asked how fast the cars were going when they contacted each other. Each participant gives a single speed estimate in miles per hour. Previous research in this area consistently finds that stronger verbs produce higher speed estimates.

Write a directional hypothesis for this study.

(Total for Question 21 is 3 marks)

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22 A developmental psychologist investigates proximity seeking in infants. Fifty infants aged between twelve and eighteen months are observed in an unfamiliar playroom. Twenty-five are observed with their primary caregiver seated in the room and twenty-five are observed with a friendly but unfamiliar adult seated in the room. An observer records the number of seconds during a five-minute session that the infant spends within one metre of the seated adult. Previous studies of proximity seeking with unfamiliar adults have produced conflicting findings.

Write an appropriate hypothesis for this study.

(Total for Question 22 is 3 marks)

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23 A psychologist investigates separation protest in nursery-aged children. Thirty-two children aged two years are each observed twice in a counterbalanced order. In one session the child's key worker remains in the room throughout; in the other session the key worker leaves the room for three minutes. An observer records the number of seconds the child spends crying during the three-minute period. Well-controlled previous research consistently finds that young children cry more when a familiar adult leaves the room.

Write a directional hypothesis for this study.

(Total for Question 23 is 3 marks)

24 A social psychologist investigates whether group size affects conformity. Participants sit in a room with either four confederates or eight confederates, all of whom give the same clearly incorrect answer on a simple line judgement task before the participant answers. Each participant completes fifteen critical trials and the psychologist records the number of trials on which the participant gives the same incorrect answer as the confederates. Previous research finds that conformity stops rising once the majority is larger than three or four people, and studies comparing majorities above that size have not pointed clearly in one direction.

Write an appropriate hypothesis for this study.

(Total for Question 24 is 3 marks)

25 A psychologist investigates whether the proximity of an authority figure affects obedience. Sixty participants are asked by a researcher in a laboratory coat to sort a large pile of documents, a task they are told is tedious and optional. For half of the participants the researcher remains in the room throughout; for the other half the researcher gives the instruction and then leaves, delivering all further instructions by telephone. The psychologist records the number of minutes out of thirty for which each participant continues sorting. Previous research consistently finds that obedience falls when the authority figure is not physically present.

Write a directional hypothesis for this study.

(Total for Question 25 is 3 marks)

26 A clinical psychologist investigates a treatment for a fear of flying. Thirty-six adults who report a fear of flying are randomly allocated to two groups. One group completes six weekly sessions of systematic desensitisation; the other group is placed on a waiting list and receives no treatment during the same six weeks. At the end of the six weeks every participant rates their anxiety about boarding an aircraft on a scale from 0 to 10. Previous well-controlled trials consistently find that systematic desensitisation reduces reported anxiety in specific phobias.

Write a directional hypothesis for this study.

(Total for Question 26 is 3 marks)

27 A psychologist investigates imitation in children. Forty-eight children aged six years each watch a two-minute film of an adult completing a puzzle. Half watch a film in which the adult is praised by a second adult for persisting when the puzzle is difficult; half watch a film in which the adult is ignored. Each child is then given a difficult puzzle and the psychologist records the number of seconds the child spends working on it before asking to stop, up to a maximum of 300 seconds. Previous research consistently finds that children imitate a model who is seen to be rewarded.

Write a directional hypothesis for this study.

(Total for Question 27 is 3 marks)

28 A psychologist investigates physiological arousal during a stressful task. Forty participants are randomly allocated to two conditions. In the evaluated condition each participant delivers a three-minute talk in front of two people who take notes throughout; in the unevaluated condition each participant delivers the same three-minute talk alone in an empty room. Heart rate in beats per minute is recorded at the end of the talk. Previous research consistently finds that being evaluated by an audience raises physiological arousal.

Write a directional hypothesis for this study.

(Total for Question 28 is 3 marks)

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29 A psychologist investigates interference in long-term memory. Sixty adults learn a list of twenty pairs of unrelated words. Half then learn a second list of twenty word pairs in which the first word of each pair is the same but the second word is different; the other half spend the same ten minutes completing a crossword. All participants are then shown the first word of each original pair and asked to write the word it was paired with. The psychologist records the number of pairs recalled correctly out of twenty. Previous studies of retroactive interference consistently find that learning a similar second list reduces recall of the first.

(a) Write a directional hypothesis for this study. **(3)**

(b) Explain why a directional hypothesis rather than a non-directional hypothesis is appropriate for this study. **(2)**

(Total for Question 29 is 5 marks)

30 A psychologist investigates a technique for interviewing witnesses. Forty-four adults watch the same three-minute film of a theft in a cafe. Two days later each is interviewed about the film either using the cognitive interview, in which the witness is asked to report everything and to recall the scene in a different order, or using a standard interview consisting of a fixed list of direct questions. The psychologist records the number of accurate details about the theft that each witness reports. Previous research consistently finds that the cognitive interview yields more accurate details.

(a) Write a directional hypothesis for this study. **(3)**

(b) Explain one advantage, for this study, of stating the hypothesis in a directional rather than a non-directional form. **(2)**

(Total for Question 30 is 5 marks)

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31 A psychologist investigates self-reported anxiety before public speaking. Fifty-two sixth form students each complete a standardised anxiety questionnaire scored out of 40, on which a higher score indicates greater anxiety. Half complete the questionnaire immediately before giving a two-minute talk to their class; the other half complete it immediately before watching a classmate give a two-minute talk. Previous research consistently finds that anticipating performing raises self-reported anxiety compared with anticipating watching.

(a) Write a directional hypothesis for this study. **(3)**

(b) Explain why the researcher would be wrong to write the hypothesis as 'Students will feel more anxious before giving a talk'. **(2)**

(Total for Question 31 is 5 marks)

32 A psychologist wants to find out whether the duration of short-term memory is affected by preventing rehearsal. She plans a study in which participants are shown a set of three consonants for two seconds and are then asked either to sit quietly for eighteen seconds or to count backwards in threes from a given number for eighteen seconds, after which they write down the three consonants. Each participant completes twelve trials and the psychologist records the number of trials out of twelve on which all three consonants are recalled in the correct order. Research using this procedure consistently finds that preventing rehearsal reduces recall.

(a) Write a suitable aim for this study. **(2)**

(b) Write a directional hypothesis for this study. **(3)**

(c) Identify the independent variable and the dependent variable in this study, stating each in its operationalised form. **(2)**

(Total for Question 32 is 7 marks)

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33 A psychologist investigates whether watching a violent film clip affects aggressive responding. Forty-eight participants watch either a ten-minute violent film clip or a ten-minute nature documentary, and then complete a word completion task in which the psychologist counts how many of twenty word stems each participant completes as an aggressive word.
Tobi writes the following hypothesis: 'Participants who watch the violent clip will be more aggressive than participants who watch the nature documentary.'
State how many of the three available marks Tobi would earn, and justify your answer.

(Total for Question 33 is 2 marks)

34 A psychologist investigates whether the gender of a storybook character affects how children rate a toy. Sixty children aged five years each read a short story in which a character plays with a construction toy. For half the children the character is described as a boy and for half as a girl. Each child then rates how much they would like to play with the toy on a scale from 1 to 5.
Saoirse writes: 'There will be a difference in the rating out of 5 that children give the construction toy between children who read about a boy character and children who read about a girl character.'
Rhys writes: 'Children will rate the toy differently depending on the character.'
State which of these two hypotheses would earn more marks, and justify your answer.

(Total for Question 34 is 2 marks)

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35 A forensic psychologist investigates whether the length of a custodial sentence affects reoffending. Records are examined for two hundred offenders released from prison, half of whom served a sentence of under twelve months and half of whom served a sentence of over three years. The psychologist records whether each offender is reconvicted within two years of release.
Callum writes the following: 'Will offenders who serve a sentence of under twelve months be reconvicted within two years more often than offenders who serve a sentence of over three years?'
Explain why Callum's statement would earn no marks as a hypothesis.

(Total for Question 35 is 2 marks)

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36 A psychologist investigates expressed emotion in the families of people with a diagnosis of schizophrenia. Forty patients recently discharged from hospital are assigned to two groups on the basis of a standardised family interview: those returning to a household rated high in expressed emotion and those returning to a household rated low in expressed emotion. The psychologist records whether each patient is readmitted to hospital within nine months.
Zainab writes: 'Patients returning to a household rated high in expressed emotion will be readmitted to hospital within nine months more often than patients returning to a household rated low in expressed emotion.'
State how many of the three available marks Zainab would earn, and justify your answer fully.

(Total for Question 36 is 3 marks)

37 A forensic psychologist investigates whether an offender behaviour programme affects impulsivity. Fifty offenders complete a standardised impulsivity questionnaire scored out of 60 both before and after a twelve-week programme; a further fifty complete the same questionnaire twelve weeks apart with no programme in between.

Farhan writes: 'Offenders who complete the twelve-week programme will show a bigger change in impulsivity than those who do not.'

State how many of the three available marks Farhan would earn, and justify your answer fully.

(Total for Question 37 is 3 marks)

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38 A psychologist investigates whether frustration increases aggressive behaviour in a driving simulator. Forty-four participants complete a ten-minute simulated drive in which they are either repeatedly delayed by slow traffic or given a clear road. The psychologist records the number of times each participant sounds the horn during the drive.

Noah writes: 'Frustrated drivers will be more aggressive.'

Noah's hypothesis would earn no marks. Rewrite it so that it would earn all three marks, and state what you have changed.

(Total for Question 38 is 3 marks)

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39 A psychologist investigates the effect of mindfulness training on reported stress in carers. Sixty unpaid carers are randomly allocated either to an eight-week mindfulness course or to a waiting list, and all complete a standardised stress questionnaire scored out of 40 at the end of the eight weeks.

Priya writes: 'To see whether mindfulness training reduces the stress scores of unpaid carers compared with a waiting list.'

State how many of the three available marks Priya would earn, and explain your answer.

(Total for Question 39 is 3 marks)

40 A psychologist investigates whether the presence of a weapon affects how well a witness recalls a face. Fifty participants watch a film in which a man either carries a kitchen knife or carries a rolled-up newspaper, and then try to identify the man from a set of ten photographs. The psychologist records whether each participant identifies the correct photograph.
Kwame writes: 'Participants who see the man carrying a kitchen knife will identify the correct photograph less often.'

(a) State how many of the three available marks Kwame would earn, and justify your answer. **(2)**

(b) Rewrite Kwame's hypothesis so that it would earn full marks, and state what you have changed. **(3)**

(Total for Question 40 is 5 marks)

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41 A psychologist investigates whether being observed affects performance on a well-practised task. Forty participants each type a passage they have practised many times, either alone in a room or with two observers watching. The psychologist records the number of words typed correctly per minute.
Oliwia writes: 'Participants who type with two observers watching will type more words correctly per minute than participants who type alone.'
Yusuf writes: 'Participants will type faster when they are watched than when they are alone.'
The examination question read: 'Write a suitable hypothesis for this study.' No previous research is reported, so either a directional or a non-directional form is acceptable.

(a) State how many of the three available marks Oliwia would earn, and how many Yusuf would earn. **(2)**

(b) Explain what separates the two hypotheses. **(2)**

(Total for Question 41 is 4 marks)

42 A psychologist measures the number of hours of sleep a group of adults reports each night and their score out of 40 on a standardised concentration test, and examines whether the two are related. A student describes the hours of sleep as the independent variable and the concentration score as the dependent variable. Explain why this description is incorrect.

(Total for Question 42 is 2 marks)

43 A psychologist has written a directional hypothesis for a study of memory and is about to look up the critical value for her statistical test. Explain what difference the fact that her hypothesis is directional rather than non-directional makes to the test she carries out.

(Total for Question 43 is 2 marks)

44 A psychologist investigates the relationship between the number of close friends a person reports having and their score on a standardised loneliness questionnaire scored out of 30, on which a higher score indicates greater loneliness. Eighty adults each report their number of close friends and complete the questionnaire. Previous research consistently finds that people with fewer close friends report greater loneliness. Write a directional hypothesis for this study.

(Total for Question 44 is 3 marks)

45 A psychologist investigates the relationship between the number of minutes of daily exercise an adult reports and their score out of 25 on a standardised sleep quality questionnaire, on which a higher score indicates better sleep. Seventy adults provide both measures. Existing evidence on daily exercise and sleep quality in adults is mixed, with some studies reporting a benefit and others reporting none. Write a non-directional hypothesis for this study.

(Total for Question 45 is 3 marks)

46 A psychologist plans a naturalistic observation of helping behaviour in a supermarket. An observer will stand near the entrance and record, for each shopper who passes a member of staff struggling with a stack of baskets, whether the shopper stops to help. Observations will be made on a weekday morning and on a Saturday afternoon. Write a suitable hypothesis for this observation.

(Total for Question 46 is 3 marks)

47 A psychologist plans a questionnaire study of attitudes to recycling. Two hundred residents will complete a twelve-item questionnaire producing a pro-recycling attitude score out of 60, and will be grouped according to whether their household has a kerbside collection or must take recycling to a central point. Previous surveys consistently report more positive attitudes where collection is easier. Write a directional hypothesis for this study.

(Total for Question 47 is 3 marks)

48 A psychologist investigates whether the order in which revision topics are studied affects recall. Thirty-two students each study six topics either in the order given in the textbook or in a random order, and then sit a test scored out of 50 covering all six topics. Existing evidence on study order and recall is inconsistent.

(a) Write the alternative hypothesis for this study. **(3)**

(b) Write the null hypothesis for this study. **(2)**

(Total for Question 48 is 5 marks)

49 A psychologist reports that the difference in recall scores between her two conditions was significant at the 0.01 level.

(a) Explain what is meant by the statement that the difference was significant at the 0.01 level. **(2)**

(b) State what the psychologist may now do with her null hypothesis, and state what she may not conclude. **(2)**

(Total for Question 49 is 4 marks)

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50 A psychologist investigates the relationship between the number of pieces of unsolicited advertising email a person receives in a week and their score out of 35 on a standardised measure of everyday irritability. Sixty adults provide both measures.

(a) Write a directional hypothesis predicting a positive correlation for this study. **(3)**

(b) Explain what a positive correlation would mean in the context of this study. **(2)**

(Total for Question 50 is 5 marks)

51 A psychologist investigates minority influence in group decision making. Forty-four groups of five people each discuss a mock jury case for twenty minutes. In each group one member is a confederate who argues for acquittal. In half of the groups the confederate supports acquittal by pointing to inconsistencies in the witness statements; in the other half the confederate supports acquittal by pointing to gaps in the forensic evidence. In both conditions the confederate argues consistently throughout. At the end the psychologist records the number of the four genuine participants in each group who vote to acquit. No previous study has compared these two lines of argument directly, so the researcher cannot predict which way the result will go.

Write a non-directional hypothesis for this study.

(Total for Question 51 is 3 marks)

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52 A psychologist investigates attention to negative words in adults with and without a diagnosis of depression. Forty adults with a current diagnosis of depression and forty adults with no history of depression each view a screen on which pairs of words appear briefly, one negative and one neutral. The psychologist records the number of trials out of sixty on which the participant looks first at the negative word. Studies using this procedure have produced inconsistent results, with some finding an attentional bias and others finding none.

Write a non-directional hypothesis for this study.

(Total for Question 52 is 3 marks)

53 A psychologist investigates checking behaviour. Thirty adults with a diagnosis of obsessive-compulsive disorder and thirty adults with no psychiatric diagnosis are each asked to leave a room, locking the door behind them, and are then observed for two minutes in a corridor fitted with a one-way mirror. An observer records the number of times each participant returns to the door and handles the lock. Previous research consistently finds elevated checking in people with a diagnosis of obsessive-compulsive disorder.

Write a directional hypothesis for this study.

(Total for Question 53 is 3 marks)

54 A psychologist investigates the effect of evening light exposure on sleep onset. Twenty-eight adults each complete two one-week conditions in a counterbalanced order. In one week they spend the hour before bed in a brightly lit room; in the other week they spend the hour before bed in a dimly lit room. Each participant wears a wrist monitor that records the number of minutes between getting into bed and falling asleep, averaged across the seven nights. Findings on evening light and sleep onset in ordinary household lighting have been inconsistent.

Write a non-directional hypothesis for this study.

(Total for Question 54 is 3 marks)

55 An occupational psychologist investigates stress in hospital staff. Fifty staff working a rota of three twelve-hour shifts per week and fifty staff working a rota of four nine-hour shifts per week each complete a standardised workplace stress questionnaire scored out of 50, on which a higher score indicates more reported stress. Both groups work the same total hours. Existing evidence comparing compressed and standard shift patterns is mixed, with some studies favouring each pattern.

Write a non-directional hypothesis for this study.

(Total for Question 55 is 3 marks)

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56 A psychologist investigates schedules of reinforcement in a laboratory task. Forty participants play a simple computer game in which pressing a key sometimes releases a point. For half the participants a point is released after every fifth press; for the other half a point is released after an unpredictable number of presses averaging one in five. The reward is then switched off entirely and the psychologist records the number of key presses each participant makes before stopping. Previous research on partial reinforcement consistently finds greater resistance to extinction under an unpredictable schedule.

(a) Write a directional hypothesis for this study. **(3)**

(b) Explain why it is important that the hypothesis states the dependent variable as the number of key presses after the reward is switched off rather than simply as 'how long participants keep playing'. **(2)**

(Total for Question 56 is 5 marks)

57 A psychologist investigates conservation of number in young children. Forty children aged five years each see two rows of eight counters. For half the children the counters in one row are spread further apart while the child watches; for the other half neither row is altered. Each child is then asked whether the two rows contain the same number of counters, and the psychologist records whether the child answers correctly.

Oliwia writes: 'Children who watch one row being spread out will answer correctly less often than children whose rows are not altered.'

Maja writes: 'Spreading one row of counters out will change the answers children give compared with leaving both rows unaltered.'

Leo writes: 'To investigate whether spreading out a row of counters affects conservation of number in five year olds.'

Rank these three statements from the highest scoring to the lowest scoring as answers to 'Write a suitable hypothesis for this study', and justify your ranking.

(Total for Question 57 is 3 marks)

58 A psychologist investigates whether the language in which a bilingual speaker is tested affects autobiographical memory. Thirty-six adults who speak both English and Polish fluently each describe memories from childhood in one of the two languages, and the psychologist counts the number of specific details each participant gives. Research comparing recall in a first and a second language has produced conflicting findings. The examination question reads: 'Write an appropriate hypothesis for this study.'

Maja writes: 'There will be no difference in the number of specific details given by bilingual adults tested in English and bilingual adults tested in Polish.'

(a) State how many of the three available marks Maja would earn, and justify your answer. **(2)**

(b) Explain why the same sentence, written in answer to a question that asked for a DIRECTIONAL hypothesis, would earn no marks at all. **(2)**

(Total for Question 58 is 4 marks)

59 A psychologist investigates whether taking part in a debating club affects public speaking confidence. Fifty students complete a standardised confidence questionnaire scored out of 25 before and after a term, half of them having attended a weekly debating club and half not. Previous research consistently reports increased confidence after structured speaking practice. The examination question reads: 'Write a directional hypothesis for this study.'
Erin writes: 'There will be no difference in the change in confidence score out of 25 between students who attend the weekly debating club and students who do not.'

(a) State how many of the three available marks Erin would earn, and name the type of hypothesis she has written. **(2)**

(b) Explain why Erin's operationalisation of the variables does not earn her any marks here. **(2)**

(Total for Question 59 is 4 marks)

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60 A psychologist investigates whether a brief relaxation exercise affects examination anxiety. Sixty-four students are randomly allocated either to complete a five-minute guided breathing exercise or to sit quietly for five minutes immediately before a mock examination, and all then rate their anxiety on a standardised scale scored out of 30. Several well-controlled previous trials have consistently found that brief breathing exercises lower reported anxiety.

(a) Write a full-mark answer to the question 'Write a directional hypothesis for this study'. **(3)**

(b) Write the null hypothesis for this study. **(2)**

(c) Explain why the null hypothesis you wrote in part (b) would earn no marks if it were offered as the answer to part (a). **(2)**

(Total for Question 60 is 7 marks)

61 A psychologist investigates whether a genetic relationship affects similarity in personality. Forty pairs of identical twins and forty pairs of non-identical twins each complete a standardised personality questionnaire that produces a score out of 100 on a measure of extraversion. For each pair the psychologist records the absolute difference between the two scores. Previous twin studies of extraversion consistently report greater similarity in identical pairs.
Four students answer the question 'Write a directional hypothesis for this study'.
Amelia writes: 'Pairs of identical twins will have a smaller absolute difference in extraversion score out of 100 than pairs of non-identical twins.'
Noah writes: 'Identical twins will be more similar in personality than non-identical twins.'
Saoirse writes: 'To investigate whether identical twins are more similar in extraversion than non-identical twins.'
Farhan writes: 'There will be a difference in the absolute difference in extraversion score out of 100 between pairs of identical twins and pairs of non-identical twins.'

(a) State the mark, out of three, that each of the four students would earn. **(2)**

(b) Explain why Saoirse earns fewer marks than Noah, even though her statement is more detailed than his. **(2)**

(c) Farhan's hypothesis is faultlessly operationalised, yet it earns no marks. Explain why. **(2)**

(Total for Question 61 is 6 marks)

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62 A psychologist plans a content analysis of how mental health is presented in newspapers. One hundred articles mentioning mental health will be sampled, fifty from tabloid newspapers and fifty from broadsheet newspapers, and each article will be coded for the number of times a person with a mental health condition is described using a word from a pre-agreed list of stigmatising terms. Write a suitable hypothesis for this content analysis.

(Total for Question 62 is 3 marks)

63 A psychologist tests whether a memory strategy improves recall, using a repeated measures design with eighteen participants. She has written a directional hypothesis. In the table of critical values for the sign test at the 0.05 significance level, the critical value for N equal to eighteen is 5 for a one-tailed test and 4 for a two-tailed test. Her calculated value of S is 5.

(a) State which critical value she should use, and justify your answer. **(2)**

(b) State whether her result is significant at the 0.05 level, and explain what would have happened had she written a non-directional hypothesis instead. **(2)**

(Total for Question 63 is 4 marks)

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64 A psychologist investigates whether the type of background lighting affects how accurately people judge facial expressions. Forty-eight participants are randomly allocated to view a set of thirty photographs under either warm lighting or cool lighting, and the number of expressions each participant identifies correctly out of thirty is recorded. Previous research on this question is inconsistent.

(a) Write a suitable hypothesis for this study. **(3)**

(b) Name the inferential statistical test the psychologist should use to analyse her results, and justify your choice. **(3)**

(c) State whether the psychologist should use a one-tailed or a two-tailed test, and justify your answer. **(2)**

(Total for Question 64 is 8 marks)

65 A psychologist investigates the relationship between the number of hours a week a teenager spends in organised sport and their score out of 20 on a standardised measure of self-esteem, on which a higher score indicates higher self-esteem. Ninety teenagers provide both measures. Previous research in this area consistently reports that greater participation in organised sport goes with higher self-esteem.

(a) Identify the two co-variables in this study, stating each in its operationalised form. **(2)**

(b) Write a directional hypothesis for this study. **(3)**

(c) Explain why the psychologist cannot conclude from a significant result that taking part in organised sport raises self-esteem. **(2)**

(Total for Question 65 is 7 marks)

66 A psychologist is planning an experiment to find out whether a short daily gratitude exercise affects mood in sixth form students. She has read six previous studies. Four of them report improved mood after gratitude exercises, but the two best controlled studies, which used larger samples and an active control condition, report no effect at all. Her supervisor tells her that the decision between a directional and a non-directional hypothesis is not a matter of preference but follows from the evidence, and that it has consequences for the analysis.

Discuss the decision the psychologist faces between a directional and a non-directional hypothesis in this study, and explain what follows from that decision for her statistical analysis.

(Total for Question 66 is 8 marks)

67 A charity that supports carers wants to know whether short, regular breaks help the people who care for a relative at home. The charity can offer some carers a two-hour supervised break twice a week for six weeks, and can contact carers through its own membership list. It has asked a psychologist to investigate.

Design a study the psychologist could carry out to investigate this question. In your answer you must state a fully operationalised hypothesis and say what type of hypothesis it is, and you must justify your choice of experimental design, your operationalisation of the variables, and the inferential statistical test you would use.

(Total for Question 67 is 12 marks)

Mark scheme · 7.6 How to Write a Hypothesis

Question 1

IV: whether the answer is given out loud in front of the confederates or privately in writing oe **B1**

DV: the number of the eighteen critical trials answered incorrectly oe **B1**

Answer: IV: whether the answer is given publicly out loud or privately in writing. DV: the number of incorrect answers out of eighteen critical trials.

Question 2

C. A hypothesis can only be tested if its variables are operationalised, that is stated in a measurable or manipulable form **B1**

Answer: C

Question 3

a statement, not an aim or a question, making a non-directional prediction, stated clearly enough to be understood on a single reading oe **B1**

both conditions of the independent variable are named in operationalised form: whether the twelve digits are read as three groups of four or as four groups of three oe **B1**

the dependent variable is stated in operationalised form: the number of digits recalled in the correct position out of twelve oe **B1**

Answer: There will be a difference in the number of digits recalled in the correct position out of twelve between participants who hear the digits read as three groups of four and participants who hear them read as four groups of three.

Question 4

D. It predicts that a difference will occur but does not say which group will be faster **B1**

Answer: D

Question 5

3 marks **B1**

justification: it is a clear directional prediction naming both conditions of the IV, highly attractive and average attractiveness, and it operationalises the DV as the number of personal facts volunteered during the five-minute conversation oe **B1**

Answer: 3 marks. It is a clearly stated directional prediction, it names both conditions of the independent variable, and the dependent variable is operationalised as the number of personal facts volunteered in the five-minute conversation.

Question 6

an aim is a general statement of what the researcher intends to investigate, the purpose of the study oe **B1**

a hypothesis is a precise, testable statement predicting the relationship between the operationalised variables oe **B1**

Answer: An aim states the general purpose of the study, for example to investigate whether the number of other passengers present affects helping behaviour. A hypothesis is a precise, testable prediction about the operationalised variables, for example that fewer passengers will offer help when six other passengers are present than when one other passenger is present.

Question 7

it is an aim **B1**

justification: it states the purpose of the study and makes no prediction about what will be found, and the variables are not operationalised oe **B1**

Answer: It is an aim, because it states what the psychologist intends to investigate rather than predicting an outcome, and neither variable is stated in a measurable form.

Question 8

it is a hypothesis **B1**

justification: it makes a testable prediction about the outcome, naming both conditions of the IV and a measurable DV oe **B1**

Answer: It is a hypothesis, because it predicts a specific outcome rather than stating a purpose, and both the conditions of the independent variable and the dependent variable are measurable.

Question 9

IV: whether the participant is tested in a silent room or with a recording of office noise playing oe **B1**

DV: the longest digit sequence recalled in the correct order oe **B1**

Answer: IV: the listening condition, silent room or office noise. DV: the longest digit sequence recalled in the correct order.

Question 10

IV: whether a familiar toy from home is present or absent during the separation oe **B1**

DV: the number of seconds spent crying during the three-minute separation oe **B1**

Answer: IV: presence or absence of a familiar toy from home. DV: the number of seconds spent crying during the three-minute separation.

Question 11

operationalisation means defining a variable in terms of how it will be manipulated or measured in the study oe **B1**

a workable operationalisation of the IV, for example testing students during the week of their final examinations compared with a week in the middle of the teaching term oe **B1**

the operationalisation gives two clearly distinguishable conditions that another researcher could reproduce oe **B1**

Answer: Operationalisation means stating a variable in terms of how it will be manipulated or measured. Stress could be operationalised as whether students are tested during the week of their final examinations or during a week in the middle of the teaching term, which gives two conditions another researcher could set up in exactly the same way.

Question 12

a measurable operationalisation, for example the score out of 20 on a multiple choice test taken one week after the lecture oe **B1**

the operationalisation states both what is measured and the scale or units it is measured on oe **B1**

'how well students learn' cannot be used because it gives no measurement procedure, so different researchers would measure different things and the study could not be replicated oe **B1**

Answer: The dependent variable could be operationalised as the score out of 20 on a multiple choice test on the lecture content taken one week later. 'How well students learn' gives no procedure or units, so two researchers could measure it in entirely different ways and the study could not be replicated.

Question 13

only one condition of the IV is named, as there is nothing for the caffeinated group to be compared with oe **B1**

the DV is not operationalised, as 'score higher on a sustained attention task' does not state the scale or units oe **B1**

a rewritten hypothesis naming both conditions and an operationalised DV, for example participants who drink a caffeinated drink will detect more targets out of 40 on a ten-minute sustained attention task than participants who drink a decaffeinated drink oe **B1**

Answer: Participants who drink a caffeinated drink will detect more targets out of 40 on a ten-minute sustained attention task than participants who drink a decaffeinated drink. The original named only the caffeinated condition and did not say how attention was scored.

Question 14

IV: the type of feedback received, written on a printed sheet or spoken by a tutor oe **B1**

DV: the number of practice attempts completed in the thirty-minute session oe **B1**

both variables are fully operationalised, because both conditions of the IV are described concretely and the DV states what is counted and over what period oe **B1**

Answer: IV: type of feedback, written on a printed sheet or spoken by a tutor. DV: the number of practice attempts completed in thirty minutes. Both are fully operationalised, since the IV names two concrete conditions and the DV states the count and the time period.

Question 15

previous findings on music and study performance conflict, so there is no consistent basis on which to predict a direction oe **B1**

a non-directional hypothesis predicts only that a difference in test performance will be found, which is all the existing evidence supports oe **B1**

Answer: The previous studies disagree about whether music helps or harms study performance, so there is no consistent evidence on which to base a prediction of direction. A non-directional hypothesis predicts only that test performance will differ between the two conditions, which is as far as the evidence allows her to go.

Question 16

previous well-controlled research consistently shows rehearsing aloud improves recall, so there is a clear basis for predicting the direction oe **B1**

a directional hypothesis states which condition will recall more words, which makes the prediction more precise and allows a one-tailed test oe **B1**

Answer: Previous research consistently finds that rehearsing aloud improves recall over rehearsing silently, so she can justify predicting which condition will be better. A directional hypothesis states that the aloud condition will recall more words, which is a more precise prediction and permits a one-tailed test.

Question 17

(a) a statement of purpose beginning 'to investigate' or equivalent, rather than a prediction oe **B1**

(a) the aim names both the mindfulness course and reported sleep, for example to investigate whether completing a six-week mindfulness course affects the number of hours of sleep adults report each night oe **B1**

(a) Answer: To investigate whether completing a six-week mindfulness course affects the number of hours of sleep adults report each night.

(b) an aim is too general to test, as it does not state what result would count as support oe **B1**

(b) the hypothesis makes a precise prediction with operationalised variables, which is what the statistical test is carried out on oe **B1**

(b) Answer: The aim only states the purpose of the study, so nothing about it can be accepted or rejected by the data. The hypothesis turns the aim into a precise prediction about operationalised variables, and it is that prediction the statistical test evaluates.

Question 18

(a) two concrete conditions are named, for example one other shopper standing nearby compared with six other shoppers standing nearby oe **B1**

(a) the conditions are stated in countable terms that could be set up identically on each trial oe **B1**

(a) Answer: The number of other shoppers standing within two metres of the actor, set at either one shopper or six shoppers.

(b) a measurable outcome is named, for example whether a passer-by offers help within thirty seconds, or the number of seconds before the first offer of help oe **B1**

(b) the measure states the observation window or the units, so every trial is scored the same way oe **B1**

(b) Answer: The number of seconds between the folder being dropped and the first passer-by offering help, recorded up to a maximum of sixty seconds.

(c) any one of: so the study can be replicated; so the hypothesis is testable; so every trial is measured in the same way; so the data can be analysed statistically oe **B1**

(c) Answer: So that the study can be replicated by another researcher in exactly the same way.

Question 19

(a) Kwame's statement **B1**

(a) Answer: Kwame's statement.

(b) Niamh's is directional and Amelia's is non-directional **B1**

(b) justification: Niamh predicts which group will have the higher heart rate, whereas Amelia predicts only that the two groups will differ oe **B1**

(b) Answer: Niamh's is directional and Amelia's is non-directional. Niamh names which group will have the higher mean heart rate, while Amelia predicts only that a difference will be found.

(c) both name both conditions of the IV in concrete terms, playing a fast-paced video game for fifteen minutes and reading a magazine for fifteen minutes oe **B1**

(c) both state the DV with its units, mean heart rate in beats per minute oe **B1**

(c) Answer: Both name both conditions of the independent variable concretely, fifteen minutes of a fast-paced video game against fifteen minutes of reading a magazine, and both state the dependent variable with its units, mean heart rate in beats per minute.

Question 20

a statement, not an aim or a question, making a directional prediction, stated clearly enough to be understood on a single reading oe **B1**

both conditions of the independent variable are named in operationalised form: whether the participant tracks the dot alone or tracks the dot while repeating a word aloud oe **B1**

the dependent variable is stated in operationalised form: the number of seconds out of 120 for which the cursor is kept on the dot oe **B1**

Answer: Participants will keep the cursor on the moving dot for fewer seconds out of 120 in the dual task condition, when they track the dot while repeating a word aloud, than in the single task condition, when they track the dot alone.

Question 21

a statement, not an aim or a question, making a directional prediction, which is the type this stem justifies, stated clearly enough to be understood on a single reading oe **B1**

both conditions of the independent variable are named in operationalised form: whether the question uses the verb 'smashed' or the verb 'contacted' oe **B1**

the dependent variable is stated in operationalised form: the speed estimate given in miles per hour oe **B1**

Answer: Participants asked how fast the cars were going when they smashed into each other will give a higher mean speed estimate in miles per hour than participants asked how fast the cars were going when they contacted each other.

Question 22

a statement, not an aim or a question, making a non-directional prediction, or a correctly written null hypothesis, which is the type this stem justifies, stated clearly enough to be understood on a single reading oe **B1**

both conditions of the independent variable are named in operationalised form: whether the seated adult is the infant's primary caregiver or a friendly but unfamiliar adult oe **B1**

the dependent variable is stated in operationalised form: the number of seconds during the five-minute session spent within one metre of the seated adult oe **B1**

Answer: There will be a difference in the number of seconds spent within one metre of the seated adult during the five-minute session between infants observed with their primary caregiver and infants observed with a friendly but unfamiliar adult.

Question 23

a statement, not an aim or a question, making a directional prediction, stated clearly enough to be understood on a single reading oe **B1**

both conditions of the independent variable are named in operationalised form: whether the key worker remains in the room or leaves the room for three minutes oe **B1**

the dependent variable is stated in operationalised form: the number of seconds the child spends crying during the three-minute period oe **B1**

Answer: Children will spend more seconds crying during the three-minute period when their key worker leaves the room than when their key worker remains in the room.

Question 24

a statement, not an aim or a question, making a non-directional prediction, or a correctly written null hypothesis, which is the type this stem justifies, stated clearly enough to be understood on a single reading oe **B1**

both conditions of the independent variable are named in operationalised form: whether the participant sits with four confederates or with eight confederates oe **B1**

the dependent variable is stated in operationalised form: the number of the fifteen critical trials on which the participant gives the same incorrect answer as the confederates oe **B1**

Answer: There will be a difference in the number of the fifteen critical trials on which participants give the same incorrect answer as the confederates between participants sitting with four confederates and participants sitting with eight confederates.

Question 25

a statement, not an aim or a question, making a directional prediction, which is the type this stem justifies, stated clearly enough to be understood on a single reading oe **B1**

both conditions of the independent variable are named in operationalised form: whether the researcher remains in the room or gives all further instructions by telephone from another room oe **B1**

the dependent variable is stated in operationalised form: the number of minutes out of thirty for which the participant continues sorting the documents oe **B1**

Answer: Participants whose researcher remains in the room will continue sorting the documents for more minutes out of thirty than participants whose researcher gives all further instructions by telephone from another room.

Question 26

a statement, not an aim or a question, making a directional prediction, stated clearly enough to be understood on a single reading oe **B1**

both conditions of the independent variable are named in operationalised form: whether the participant completes six weekly sessions of systematic desensitisation or is placed on a waiting list with no treatment oe **B1**

the dependent variable is stated in operationalised form: the anxiety rating about boarding an aircraft given on the scale from 0 to 10 oe **B1**

Answer: Adults who complete six weekly sessions of systematic desensitisation will give a lower mean anxiety rating on the 0 to 10 scale than adults placed on a waiting list with no treatment.

Question 27

a statement, not an aim or a question, making a directional prediction, which is the type this stem justifies, stated clearly enough to be understood on a single reading oe **B1**

both conditions of the independent variable are named in operationalised form: whether the adult in the film is praised for persisting or is ignored oe **B1**

the dependent variable is stated in operationalised form: the number of seconds the child spends working on the difficult puzzle before asking to stop, up to a maximum of 300 oe **B1**

Answer: Children who watch a film in which the adult is praised for persisting will spend more seconds working on the difficult puzzle before asking to stop than children who watch a film in which the adult is ignored.

Question 28

a statement, not an aim or a question, making a directional prediction, stated clearly enough to be understood on a single reading oe **B1**

both conditions of the independent variable are named in operationalised form: whether the three-minute talk is delivered in front of two note-taking observers or alone in an empty room oe **B1**

the dependent variable is stated in operationalised form: heart rate in beats per minute recorded at the end of the talk oe **B1**

Answer: Participants who deliver the three-minute talk in front of two note-taking observers will have a higher mean heart rate in beats per minute at the end of the talk than participants who deliver the talk alone in an empty room.

Question 29

(a) a statement, not an aim or a question, making a directional prediction, stated clearly enough to be understood on a single reading oe **B1**

(a) both conditions of the independent variable are named in operationalised form: learning a second, similar list of word pairs compared with completing a crossword for ten minutes oe **B1**

(a) the dependent variable is stated in operationalised form: the number of word pairs recalled correctly out of twenty oe **B1**

(a) Answer: Participants who learn a second, similar list of word pairs will recall fewer of the original twenty word pairs correctly than participants who spend ten minutes completing a crossword.

(b) previous studies of retroactive interference consistently find that a similar second list reduces recall of the first oe **B1**

(b) a consistent body of prior findings gives a justified basis for predicting which condition will recall fewer pairs, so the more precise directional form is warranted oe **B1**

(b) Answer: Previous research on retroactive interference consistently reports that learning a similar second list lowers recall of the first, so there is a justified basis for predicting the direction. That allows the more precise directional prediction that the second-list group will recall fewer pairs.

Question 30

(a) a statement, not an aim or a question, making a directional prediction, stated clearly enough to be understood on a single reading oe **B1**

(a) both conditions of the independent variable are named in operationalised form: the cognitive interview compared with a standard interview of fixed direct questions oe **B1**

(a) the dependent variable is stated in operationalised form: the number of accurate details about the theft reported oe **B1**

(a) Answer: Witnesses interviewed using the cognitive interview will report more accurate details about the theft than witnesses interviewed using a standard interview consisting of a fixed list of direct questions.

(b) any one advantage, for example it permits a one-tailed test, or it commits the researcher to a more precise and more easily falsified prediction oe **B1**

(b) the advantage is developed in context, for example a one-tailed test places the whole region of rejection at the predicted end, so a genuine advantage of the cognitive interview needs less extreme data to reach significance than it would under a two-tailed test oe **B1**

(b) Answer: Because the hypothesis is directional a one-tailed test can be used. A one-tailed test places the whole region of rejection at the predicted end rather than splitting it between both ends, so if the cognitive interview really does yield more accurate details, that difference needs less extreme data to reach significance than it would under a two-tailed test.

Question 31

(a) a statement, not an aim or a question, making a directional prediction, stated clearly enough to be understood on a single reading oe **B1**

(a) both conditions of the independent variable are named in operationalised form: completing the questionnaire immediately before giving a two-minute talk compared with immediately before watching a classmate give one oe **B1**

(a) the dependent variable is stated in operationalised form: the score out of 40 on the standardised anxiety questionnaire oe **B1**

(a) Answer: Students who complete the anxiety questionnaire immediately before giving a two-minute talk will score higher out of 40 than students who complete it immediately before watching a classmate give a two-minute talk.

(b) only one condition of the IV is named, as there is nothing the talk-giving group is compared with oe **B1**

(b) the DV is not operationalised, since 'feel more anxious' does not state the questionnaire or the score out of 40 that will be used to measure it oe **B1**

(b) Answer: It names only one condition of the independent variable, giving nothing for the talk-giving group to be compared against, and it does not operationalise the dependent variable, since 'feel more anxious' says nothing about the anxiety questionnaire or its score out of 40.

Question 32

(a) a statement of purpose rather than a prediction, for example beginning 'to investigate whether' oe **B1**

(a) the aim names both the rehearsal manipulation and recall of the consonants oe **B1**

(a) Answer: To investigate whether preventing rehearsal during an eighteen-second delay affects how well participants recall a set of three consonants.

(b) a statement, not an aim or a question, making a directional prediction, stated clearly enough to be understood on a single reading oe **B1**

(b) both conditions of the independent variable are named in operationalised form: sitting quietly for eighteen seconds compared with counting backwards in threes for eighteen seconds oe **B1**

(b) the dependent variable is stated in operationalised form: the number of trials out of twelve on which all three consonants are recalled in the correct order oe **B1**

(b) Answer: Participants who count backwards in threes for eighteen seconds will recall all three consonants in the correct order on fewer of the twelve trials than participants who sit quietly for eighteen seconds.

(c) IV: whether the eighteen-second delay is spent sitting quietly or counting backwards in threes oe **B1**

(c) DV: the number of trials out of twelve on which all three consonants are recalled in the correct order oe **B1**

(c) Answer: IV: how the eighteen-second delay is spent, sitting quietly or counting backwards in threes. DV: the number of trials out of twelve on which all three consonants are recalled in the correct order.

Question 33

2 marks **B1**

justification: it is a clear directional statement naming both conditions of the IV, but the DV is not operationalised, since 'more aggressive' does not state the count of aggressive word completions out of twenty oe **B1**

Answer: 2 marks. The statement is clear and directional and names both conditions of the independent variable, but the dependent variable is not operationalised, because 'more aggressive' says nothing about the number of aggressive word completions out of twenty.

Question 34

Saoirse's hypothesis **B1**

justification: Saoirse names both conditions of the IV and operationalises the DV as the rating out of 5, whereas Rhys names neither condition explicitly and does not state how the rating is measured oe **B1**

Answer: Saoirse's. She names both conditions of the independent variable, a boy character and a girl character, and operationalises the dependent variable as the rating out of 5. Rhys states neither condition explicitly and gives no measure.

Question 35

it is written as a question rather than as a statement oe **B1**

a hypothesis must be a testable prediction that the data can support or fail to support, and a question predicts nothing, so it scores zero however well operationalised its variables are oe **B1**

Answer: It is phrased as a question, not as a statement. A hypothesis has to be a prediction that the data can support or fail to support, and a question makes no prediction, so it earns nothing even though both variables here are well operationalised.

Question 36

3 marks **B1**

it is a clear directional statement naming both conditions of the IV, high and low expressed emotion households oe **B1**

the DV is operationalised as readmission to hospital within nine months, which states both the outcome and the time window oe **B1**

Answer: 3 marks. It is clear and directional, it names both conditions of the independent variable, and it operationalises the dependent variable as readmission to hospital within a stated nine-month window.

Question 37

2 marks **B1**

it is a clear directional statement and it names both conditions of the IV, completing the twelve-week programme and not completing it oe **B1**

the DV is not operationalised, since 'a bigger change in impulsivity' does not state the change in score out of 60 on the impulsivity questionnaire oe **B1**

Answer: 2 marks. The statement is clear and directional and both conditions of the independent variable are named, but the dependent variable is not operationalised because it does not refer to the change in score out of 60 on the impulsivity questionnaire.

Question 38

the rewritten hypothesis names both conditions of the IV: repeatedly delayed by slow traffic and given a clear road oe **B1**

the rewritten hypothesis states the DV in operationalised form: the number of times the horn is sounded during the ten-minute drive oe **B1**

the changes are identified, including that the original named only one condition of the IV, so there was nothing for the frustrated drivers to be compared with oe **B1**

Answer: Participants who are repeatedly delayed by slow traffic will sound the horn more times during the ten-minute simulated drive than participants who are given a clear road. The changes are that the comparison condition has been added and that 'more aggressive' has been replaced by the count of horn soundings.

Question 39

0 marks **B1**

the statement is an aim, not a hypothesis, because 'to see whether' states the purpose of the study rather than predicting an outcome oe **B1**

an aim earns zero however well its variables are described, so the fact that Priya names both conditions and refers to stress scores does not rescue it oe **B1**

Answer: 0 marks. 'To see whether' states the purpose of the study rather than predicting what will be found, so it is an aim. An aim earns nothing on a hypothesis question even when, as here, both conditions and the measure are described.

Question 40

(a) 0 marks **B1**

(a) justification: only one condition of the IV is named, the kitchen knife, with no comparison condition stated, and a one-condition statement scores zero however well the DV is operationalised oe **B1**

(a) Answer: 0 marks. He names only one condition of the independent variable, giving nothing for the knife condition to be compared against. That scores zero however well the dependent variable is operationalised.

(b) a directional prediction of the same form as the original, clearly stated oe **B1**

(b) both conditions of the IV are named: carrying a kitchen knife and carrying a rolled-up newspaper oe **B1**

(b) the change is identified: what was missing from the original and what has been added oe **B1**

(b) Answer: Participants who see the man carrying a kitchen knife will identify the correct photograph from the set of ten less often than participants who see the man carrying a rolled-up newspaper.

Question 41

(a) Oliwia earns 3 marks **B1**

(a) Yusuf earns 1 mark **B1**

(a) Answer: Oliwia earns 3 marks and Yusuf earns 1 mark.

(b) Oliwia operationalises the IV as typing with two observers watching against typing alone, whereas 'watched' and 'alone' restate the conditions without the detail the stem gives oe **B1**

(b) Oliwia operationalises the DV as words typed correctly per minute, whereas 'faster' states neither the unit nor the accuracy requirement oe **B1**

(b) Answer: Both name both conditions, so the difference is entirely operationalisation. Oliwia states the conditions as typing with two observers watching against typing alone and the dependent variable as words typed correctly per minute. Yusuf operationalises neither, and 'faster' gives no units and no accuracy requirement.

Question 42

neither variable is manipulated by the researcher, as both hours of sleep and concentration score are simply measured as they occur oe — **B1**

in a correlation the two variables are called co-variables, and because nothing is manipulated no statement about cause can be made oe — **B1**

Answer: Neither variable is manipulated: both hours of sleep and concentration score are measured as they naturally occur. In a correlation the two measured variables are called co-variables, and because nothing is manipulated the study cannot show that one causes the other.

Question 43

a directional hypothesis requires a one-tailed test, whereas a non-directional hypothesis requires a two-tailed test oe — **B1**

she must read the critical value from the one-tailed column of the table, and at a given significance level this critical value differs from the two-tailed one oe — **B1**

Answer: A directional hypothesis is tested with a one-tailed test, so she must read the critical value from the one-tailed column of the table rather than the two-tailed column. At the same significance level the two columns give different critical values.

Question 44

a statement predicting a relationship or correlation, not a difference, and naming its direction as negative oe — **B1**

the first co-variable is operationalised: the number of close friends the person reports having oe — **B1**

the second co-variable is operationalised: the score out of 30 on the standardised loneliness questionnaire oe — **B1**

Answer: There will be a negative correlation between the number of close friends an adult reports having and their score out of 30 on the standardised loneliness questionnaire.

Question 45

a statement predicting a relationship or correlation without naming its direction oe — **B1**

the first co-variable is operationalised: the number of minutes of daily exercise reported oe — **B1**

the second co-variable is operationalised: the score out of 25 on the standardised sleep quality questionnaire oe — **B1**

Answer: There will be a correlation between the number of minutes of daily exercise an adult reports and their score out of 25 on the standardised sleep quality questionnaire.

Question 46

a statement predicting a difference, of either direction, rather than an aim or a question oe — **B1**

both conditions are named: a weekday morning and a Saturday afternoon oe — **B1**

the behavioural category is operationalised: the proportion or number of shoppers who stop to help the member of staff oe — **B1**

Answer: There will be a difference in the proportion of shoppers who stop to help the member of staff between observations made on a weekday morning and observations made on a Saturday afternoon.

Question 47

a directional prediction, which is the type the consistent previous surveys justify oe — **B1**

both conditions are named: a household with a kerbside collection and a household that must take recycling to a central point oe — **B1**

the DV is operationalised: the pro-recycling attitude score out of 60 on the twelve-item questionnaire oe — **B1**

Answer: Residents whose household has a kerbside collection will have a higher mean pro-recycling attitude score out of 60 than residents whose household must take recycling to a central point.

Question 48

(a) a statement, not an aim or a question, making a non-directional prediction, stated clearly enough to be understood on a single reading oe — **B1**

(a) both conditions of the independent variable are named in operationalised form: studying the six topics in the order given in the textbook compared with studying them in a random order oe — **B1**

(a) the dependent variable is stated in operationalised form: the score out of 50 on the test covering all six topics oe — **B1**

(a) Answer: There will be a difference in the mean test score out of 50 between students who study the six topics in the order given in the textbook and students who study them in a random order.

(b) a statement that there will be no difference, with any difference attributed to chance oe — **B1**

(b) both conditions and the operationalised DV are retained in the null statement oe — **B1**

(b) Answer: There will be no difference in the mean test score out of 50 between students who study the six topics in the order given in the textbook and students who study them in a random order, and any difference found will be due to chance.

Question 49

(a) there is a probability of less than one per cent that a difference this large would have arisen if the null hypothesis were true oe — **B1**

(a) the difference is therefore very unlikely to be due to chance alone oe — **B1**

(a) Answer: There is less than a one per cent probability that a difference of this size would have occurred if the null hypothesis were true, so the difference is very unlikely to be due to chance alone.

(b) she may reject the null hypothesis and accept the alternative hypothesis oe — **B1**

(b) she may not conclude that the result is certain or proved, because a one per cent probability of a chance result remains oe — **B1**

(b) Answer: She may reject the null hypothesis and accept the alternative hypothesis. She may not conclude that the result is certain, because there remains up to a one per cent probability that the difference arose by chance.

Question 50

(a) a statement, not an aim or a question, predicting a positive correlation, stated clearly enough to be understood on a single reading oe **B1**

(a) the first co-variable is stated in operationalised form: the number of pieces of unsolicited advertising email received in a week oe **B1**

(a) the second co-variable is stated in operationalised form: the score out of 35 on the standardised measure of everyday irritability oe **B1**

(a) Answer: There will be a positive correlation between the number of pieces of unsolicited advertising email an adult receives in a week and their score out of 35 on the standardised measure of everyday irritability.

(b) as one co-variable increases the other also increases oe **B1**

(b) stated in context: adults who receive more unsolicited advertising emails in a week tend to have higher irritability scores out of 35 oe **B1**

(b) Answer: A positive correlation means that as one co-variable increases so does the other. Here it would mean that adults who receive more unsolicited advertising emails in a week tend to score higher out of 35 on the irritability measure.

Question 51

a statement, not an aim or a question, making a non-directional prediction, stated clearly enough to be understood on a single reading oe **B1**

both conditions of the independent variable are named in operationalised form: whether the confederate supports acquittal by pointing to inconsistencies in the witness statements or to gaps in the forensic evidence oe **B1**

the dependent variable is stated in operationalised form: the number of the four genuine participants in each group who vote to acquit oe **B1**

Answer: There will be a difference in the number of the four genuine participants voting to acquit between groups in which the confederate points to inconsistencies in the witness statements and groups in which the confederate points to gaps in the forensic evidence.

Question 52

a statement, not an aim or a question, making a non-directional prediction, stated clearly enough to be understood on a single reading oe **B1**

both conditions of the independent variable are named in operationalised form: whether the participant has a current diagnosis of depression or no history of depression oe **B1**

the dependent variable is stated in operationalised form: the number of trials out of sixty on which the participant looks first at the negative word oe **B1**

Answer: There will be a difference in the number of trials out of sixty on which participants look first at the negative word between adults with a current diagnosis of depression and adults with no history of depression.

Question 53

a statement, not an aim or a question, making a directional prediction, which is the type this stem justifies, stated clearly enough to be understood on a single reading oe **B1**

both conditions of the independent variable are named in operationalised form: whether the participant has a diagnosis of obsessive-compulsive disorder or no psychiatric diagnosis oe **B1**

the dependent variable is stated in operationalised form: the number of times the participant returns to the door and handles the lock during the two minutes oe **B1**

Answer: Adults with a diagnosis of obsessive-compulsive disorder will return to the door and handle the lock more times during the two-minute period than adults with no psychiatric diagnosis.

Question 54

a statement, not an aim or a question, making a non-directional prediction, stated clearly enough to be understood on a single reading oe **B1**

both conditions of the independent variable are named in operationalised form: whether the hour before bed is spent in a brightly lit room or a dimly lit room oe **B1**

the dependent variable is stated in operationalised form: the mean number of minutes between getting into bed and falling asleep across the seven nights oe **B1**

Answer: There will be a difference in the mean number of minutes between getting into bed and falling asleep between the week in which participants spend the hour before bed in a brightly lit room and the week in which they spend it in a dimly lit room.

Question 55

a statement, not an aim or a question, making a non-directional prediction, stated clearly enough to be understood on a single reading oe **B1**

both conditions of the independent variable are named in operationalised form: whether the member of staff works three twelve-hour shifts per week or four nine-hour shifts per week oe **B1**

the dependent variable is stated in operationalised form: the score out of 50 on the standardised workplace stress questionnaire oe **B1**

Answer: There will be a difference in the mean score out of 50 on the standardised workplace stress questionnaire between staff working three twelve-hour shifts per week and staff working four nine-hour shifts per week.

Question 56

(a) a statement, not an aim or a question, making a directional prediction, stated clearly enough to be understood on a single reading oe **B1**

(a) both conditions of the independent variable are named in operationalised form: a point after every fifth press compared with a point after an unpredictable number of presses averaging one in five oe **B1**

(a) the dependent variable is stated in operationalised form: the number of key presses made after the reward is switched off, before stopping oe **B1**

(a) Answer: Participants rewarded after an unpredictable number of presses averaging one in five will make more key presses before stopping, once the reward is switched off, than participants rewarded after every fifth press.

(b) 'how long participants keep playing' does not state what is counted or in what units, so different researchers could measure it in different ways oe **B1**

(b) an operationalised DV makes the study replicable and allows the data to be analysed statistically, because every participant is scored on the same quantity oe **B1**

(b) Answer: 'How long participants keep playing' names no unit and no procedure, so one researcher might time it in minutes and another count presses. Stating the dependent variable as the number of key presses after the reward is switched off scores every participant on the same quantity, which makes the study replicable and the data analysable.

Question 57

correct order: Oliwia highest, then Maja, then Leo lowest **B1**

Oliwia scores highest because she gives a clear directional prediction naming both conditions of the IV and an operationalised DV, whether the child answers correctly oe **B1**

Leo scores lowest because his statement is an aim, which earns zero, whereas Maja names both conditions and so reaches the one-mark tier, operationalising neither variable oe **B1**

Answer: Oliwia, then Maja, then Leo. Oliwia gives a clear directional prediction with both conditions of the independent variable and an operationalised dependent variable, so 3 marks. Maja names both conditions but operationalises neither variable, so 1 mark. Leo has written an aim rather than a prediction, so 0.

Question 58

(a) 3 marks **B1**

(a) Maja has written a null hypothesis, and where the question asks for an appropriate hypothesis and the evidence justifies a non-directional prediction, a correctly written null hypothesis is credited in full oe **B1**

(a) Answer: 3 marks. She has written a null hypothesis. Because the question asked for an appropriate hypothesis and the conflicting evidence means the appropriate prediction is non-directional, a correctly written null hypothesis earns full credit here.

(b) a null hypothesis predicts no difference, so it states no direction oe **B1**

(b) a question that demands a directional hypothesis is answered only by a statement predicting which condition will score higher, so a null hypothesis is the wrong type and scores zero oe **B1**

(b) Answer: A null hypothesis predicts no difference, so it states no direction at all. A question that explicitly demands a directional hypothesis can only be answered by a statement saying which condition will score higher, so the null form is the wrong type and earns zero.

Question 59

(a) 0 marks **B1**

(a) she has written a null hypothesis oe **B1**

(a) Answer: 0 marks. She has written a null hypothesis.

(b) the marks for operationalisation are only available once the hypothesis is of the type the question demanded oe **B1**

(b) because the question asked for a directional hypothesis and she wrote a null one, the answer is judged the wrong type and scores zero before operationalisation is considered at all oe **B1**

(b) Answer: Marks for naming both conditions and operationalising the dependent variable only become available once the hypothesis is of the type the question demanded. Her statement is a null hypothesis where a directional one was required, so it is the wrong type and scores zero before the quality of the operationalisation is considered.

Question 60

(a) a statement, not an aim or a question, making a directional prediction, stated clearly enough to be understood on a single reading oe **B1**

(a) both conditions of the independent variable are named in operationalised form: the five-minute guided breathing exercise compared with sitting quietly for five minutes oe **B1**

(a) the dependent variable is stated in operationalised form: the anxiety rating out of 30 on the standardised scale oe **B1**

(a) Answer: Students who complete a five-minute guided breathing exercise before the mock examination will give a lower anxiety rating out of 30 than students who sit quietly for five minutes.

(b) a statement that there will be no difference, or that any difference is due to chance oe **B1**

(b) both conditions of the IV and the operationalised DV are retained in the null statement oe **B1**

(b) Answer: There will be no difference in the mean anxiety rating out of 30 between students who complete a five-minute guided breathing exercise and students who sit quietly for five minutes, and any difference found will be due to chance.

(c) part (a) explicitly demanded a directional hypothesis, which must state which condition will score lower or higher oe **B1**

(c) a null hypothesis predicts no difference, so it is the wrong type for that question and earns zero regardless of how well its variables are operationalised oe **B1**

(c) Answer: Part (a) explicitly asked for a directional hypothesis, which must say which group will report lower anxiety. The null hypothesis predicts no difference at all, so it is the wrong type for that question and earns zero however well its variables are operationalised.

Question 61

(a) Amelia 3 marks and Noah 2 marks **B1**

(a) Saoirse 0 marks and Farhan 0 marks **B1**

(a) Answer: Amelia 3, Noah 2, Saoirse 0, Farhan 0.

(b) Saoirse has written an aim, which predicts nothing and therefore earns zero regardless of detail oe **B1**

(b) Noah has written a directional prediction naming both conditions of the IV, so he earns two marks, losing only the third because the DV is not operationalised oe **B1**

(b) Answer: Saoirse has written an aim. An aim makes no prediction, so it earns zero however much detail it contains. Noah has written a directional prediction that names both conditions of the independent variable, so he earns two of the three marks and loses only the one for operationalising the dependent variable.

(c) the question asked for a directional hypothesis, and the stem's consistently greater similarity in identical pairs is what makes that the appropriate type oe **B1**

(c) Farhan's hypothesis is non-directional, which is the wrong type here, and a hypothesis of the wrong type scores zero however well its variables are operationalised oe **B1**

(c) Answer: The question asked for a directional hypothesis, and the stem's consistent evidence supports one. Farhan's is non-directional. That is the wrong type for the question that was asked, and the wrong type scores zero no matter how well the variables are operationalised.

Question 62

a statement predicting a difference, of either direction, rather than an aim or a question oe **B1**

both conditions are named: articles sampled from tabloid newspapers and articles sampled from broadsheet newspapers oe **B1**

the coding unit is operationalised: the number of uses per article of a word from the pre-agreed list of stigmatising terms oe **B1**

Answer: Articles sampled from tabloid newspapers will contain more uses per article of words from the pre-agreed list of stigmatising terms than articles sampled from broadsheet newspapers.

Question 63

(a) she should use the one-tailed critical value of 5 **B1**

(a) justification: her hypothesis is directional, and a directional hypothesis is tested one-tailed oe **B1**

(a) Answer: She should use the one-tailed critical value of 5, because her hypothesis is directional and a directional hypothesis is tested with a one-tailed test.

(b) the result is significant, because for the sign test the calculated value of 5 is equal to or less than the critical value of 5 oe **B1**

(b) with a non-directional hypothesis the critical value would have been 4, and as 5 is greater than 4 the result would not have been significant oe **B1**

(b) Answer: The result is significant, because for the sign test the calculated value must be equal to or less than the critical value, and 5 is equal to 5. Had she written a non-directional hypothesis the critical value would have been 4, and since 5 is greater than 4 the result would not have reached significance.

Question 64

(a) a statement, not an aim or a question, making a non-directional prediction, stated clearly enough to be understood on a single reading oe **B1**

(a) both conditions of the independent variable are named in operationalised form: warm lighting and cool lighting oe **B1**

(a) the dependent variable is stated in operationalised form: the number of facial expressions identified correctly out of thirty oe **B1**

(a) Answer: There will be a difference in the number of facial expressions identified correctly out of thirty between participants who view the photographs under warm lighting and participants who view them under cool lighting.

(b) the Mann-Whitney test, or the unrelated t-test if the data are treated as interval and normally distributed oe **B1**

(b) the hypothesis predicts a difference rather than a relationship oe **B1**

(b) the design is independent groups, since participants are randomly allocated to one lighting condition only, and the data are at least ordinal oe **B1**

(b) Answer: A Mann-Whitney test. The hypothesis predicts a difference rather than a relationship, the design is independent groups because each participant experiences only one lighting condition, and the number correct out of thirty is at least ordinal data.

(c) two-tailed **B1**

(c) because the hypothesis is non-directional: it predicts a difference without stating which condition will score higher oe **B1**

(c) Answer: Two-tailed, because the hypothesis is non-directional: it predicts a difference without saying which lighting condition will score higher.

Question 65

(a) the number of hours a week spent in organised sport oe **B1**

(a) the score out of 20 on the standardised measure of self-esteem oe **B1**

(a) Answer: The number of hours a week spent in organised sport, and the score out of 20 on the standardised self-esteem measure.

(b) a statement, not an aim or a question, predicting a positive correlation, stated clearly enough to be understood on a single reading oe **B1**

(b) the first co-variable is stated in operationalised form: the number of hours a week spent in organised sport oe **B1**

(b) the second co-variable is stated in operationalised form: the score out of 20 on the standardised self-esteem measure oe **B1**

(b) Answer: There will be a positive correlation between the number of hours a week a teenager spends in organised sport and their score out of 20 on the standardised self-esteem measure.

(c) a correlation shows only that the two co-variables vary together, and neither has been manipulated, so causation cannot be inferred oe **B1**

(c) the relationship could run the other way, with teenagers who already have higher self-esteem choosing to join more sport, or a third variable such as family income could explain both oe **B1**

(c) Answer: A correlation shows only that the two co-variables vary together, and because neither was manipulated no cause can be inferred. The relationship could run the other way, with higher self-esteem leading teenagers to join more sport, or a third variable such as family income could raise both.

Question 66

Level 4 Discussion is clear, coherent and well organised. The evidence in the stem is weighed rather than described, and the consequences for the analysis are accurate and explicit. Specialist terminology is used effectively throughout. **7-8**

Level 3 Discussion is mostly clear and organised. The evidence is used to support a position, although some of the reasoning is underdeveloped. Consequences for the analysis are broadly accurate. Specialist terminology is mostly used appropriately. **5-6**

Level 2 Discussion lacks clarity or organisation in places. The evidence is described more than it is weighed, or only one side of the decision is considered. Consequences for the analysis are limited or partly inaccurate. Specialist terminology is used inconsistently. **3-4**

Level 1 Discussion is muddled or very limited. The difference between the two types of hypothesis may be asserted without reference to the stem, and consequences for the analysis are absent or incorrect. Specialist terminology is absent or inappropriate. **1-2**

Indicative content:

- the direction of a hypothesis must be justified by the existing evidence, not by what the researcher hopes to find
- four of the six studies point one way, which on a simple count would favour a directional hypothesis
- counting studies is a weak basis for the decision, because the two studies that report no effect are the better controlled and used an active control condition
- where well-controlled evidence conflicts with less well-controlled evidence the field cannot be said to point consistently in one direction, which favours a non-directional hypothesis
- a non-directional hypothesis predicts only that mood scores will differ between the gratitude condition and the control condition
- a non-directional hypothesis is tested two-tailed, so the critical value is read from the two-tailed column and a difference in either direction can reach significance
- a directional hypothesis would be tested one-tailed, which makes a difference in the predicted direction easier to detect but leaves a difference in the opposite direction undetectable
- choosing a directional hypothesis here would risk a Type II error with respect to a harmful effect, since a fall in mood could not be reported as significant
- whichever type is chosen, both conditions of the independent variable and an operationalised measure of mood must appear in the hypothesis
- the decision should be made and recorded before the data are collected, since choosing the direction afterwards would inflate the chance of a Type I error

Question 67

Level 4 The design is coherent and could be carried out as described. A fully operationalised hypothesis of a correctly identified type is stated. Justifications for the design, the operationalisation and the statistical test are accurate and are tied to the specific features of this study. Specialist terminology is used effectively throughout. **10-12**

Level 3 The design is mostly coherent and workable. The hypothesis is stated and largely operationalised, and its type is correctly identified. Justifications are mostly accurate, although one is underdeveloped or generic. Specialist terminology is mostly used appropriately. **7-9**

Level 2 The design is partly workable but important details are missing or unclear. The hypothesis is present but one variable is not operationalised, or its type is not identified. Some justification is offered but it is limited or partly inaccurate. Specialist terminology is used inconsistently. **4-6**

Level 1 The design is fragmentary and could not be carried out as described. The hypothesis is absent, is an aim, or leaves both variables unoperationalised. Justification is absent or incorrect. Specialist terminology is absent or inappropriate. **1-3**

Indicative content:

- an independent groups design in which one group of carers receives a two-hour supervised break twice a week for six weeks and a matched group continues without the breaks
- a repeated measures design measuring each carer before and after the six-week period, which controls participant variables but introduces order effects and cannot separate the break from the passage of time
- a matched pairs design pairing carers on hours of care given per week and on the condition of the relative, which controls the most important participant variables without order effects
- the independent variable operationalised as whether the carer receives the two-hour supervised break twice weekly for six weeks or continues with their usual arrangements
- the dependent variable operationalised as the score on a standardised carer strain questionnaire, for example out of 40, administered at the end of the six weeks
- a directional hypothesis is justifiable where the student cites consistent evidence that respite reduces carer strain, and a non-directional hypothesis is justifiable where the student notes that breaks may also increase anxiety about leaving the relative
- a worked hypothesis such as: carers who receive a two-hour supervised break twice a week for six weeks will score lower on the carer strain questionnaire out of 40 than carers who continue with their usual arrangements
- the null hypothesis stated alongside the alternative, with any difference attributed to chance
- a Mann-Whitney test for an independent groups design with at least ordinal data, or a Wilcoxon test for a repeated measures or matched pairs design
- the test is one-tailed for a directional hypothesis and two-tailed for a non-directional one, and the significance level should be set at 0.05 before the data are collected
- sampling from the charity's own membership list produces a volunteer sample, which limits how far the findings generalise to carers who are not charity members
- ethical considerations include informed consent, the right to withdraw, and the difficulty of offering a valued service to one group and not the other, which may be addressed by offering the breaks to the control group after the study