OCR
Oxford Cambridge and RSA

Sample Question Paper

A Level Psychology

H569/01 Research methods

Time allowed: 2 hours

You must have:
• a scientific or graphical calculator

Please write clearly in black ink. **Do not write in the barcodes.**

Centre number | Candidate number

First name(s)

Last name

INSTRUCTIONS
• Use black ink. You can use an HB pencil, but only for graphs and diagrams.
• Write your answer to each question in the space provided. If you need extra space use the lined pages at the end of this booklet. The question numbers must be clearly shown.
• Answer **all** the questions.

INFORMATION
• The total mark for this paper is **80**.
• The marks for each question are shown in brackets **[ ]**.
• This document has **20** pages.

ADVICE
• Read each question carefully before you start your answer.

Section A

Multiple Choice

For each question, put the letter of the correct answer in the box provided.

1 Which of the following sampling techniques ensures everyone in the target population has an equal chance of being in the sample?

A opportunity

B random

C self-selected

D snowball

Your answer [ ] **[1]**

2 Which of the following is a strength of a laboratory experiment?

A high replicability

B high ecological validity

C no chance of demand characteristics

D no order effects

Your answer [ ] **[1]**

3 A teacher asked 25 participants to complete a test. Only one person scored full marks on the test. What proportion of participants scored full marks, expressed as a decimal?

A 0.02

B 0.04

C 0.05

D 0.25

Your answer [ ] **[1]**

4 Which of the following is a type of reliability?

    A   ecological

    B   face

    C   predictive

    D   test-retest

Your answer   ☐   **[1]**

5 Which of the following best describes what a 'Type 2' error refers to?

    A   incorrectly accepting the null hypothesis

    B   incorrectly rejecting the null hypothesis

    C   use of the incorrect inferential statistical test

    D   use of the incorrect table of critical values

Your answer   ☐   **[1]**

6 Which of the following tasks was **not** used in Baron-Cohen et al.'s (1997) study of autism?

    A   Basic Emotion Recognition task

    B   Gender Recognition task

    C   Go/No-Go task

    D   Strange Stories task

Your answer   ☐   **[1]**

7   The table below displays the data from an experiment investigating the difference in memory ability between a group of young people and a group of old people:

Scores in a memory test where participants were asked to recall 30 words.			
Young people (age 16–25)		Old people (age 65–75)	
Participant	Score	Participant	Score
A	26	G	7
B	28	H	25
C	22	I	12
D	30	J	22
E	25	K	12
F	28	L	12

(a) What is the value of $\overline{x}$ in the formula below when calculating the standard deviation of the memory scores for the group of **old** people in this study?

$$\sqrt{\frac{\Sigma(X - \overline{X})^2}{n-1}}$$

A   12

B   15

C   18

D   90

Your answer [   ]   **[1]**

(b) What is the value of **n** in the formula below when calculating the standard deviation of the memory scores for the group of **old** people in this study?

$$\sqrt{\frac{\Sigma(X - \overline{X})^2}{n-1}}$$

A   6

B   8

C   12

D   15

Your answer [   ]   **[1]**

(c) The variance for the number of words recalled by the group of **old** people is 48. What is the standard deviation for this group?

A 4

B 6.93

C 9.6

D 2304

Your answer ☐ **[1]**

(d) Which of the following could be an extraneous variable in this experiment?

A age

B eyesight

C height

D income

Your answer ☐ **[1]**

(e) What would be the appropriate inferential statistical test to use to analyse the data from this experiment?

A Binomial Sign test

B Chi-square test

C Mann-Whitney U test

D Wilcoxon Signed Ranks test

Your answer ☐ **[1]**

8 Which variable was negatively correlated with length of time as a taxi driver in Maguire et al.'s (2000) study of brain plasticity.

A volume of grey matter in the anterior hippocampus

B volume of grey matter in the central hippocampus

C volume of grey matter in the hippocampus

D volume of grey matter in the posterior hippocampus

Your answer ☐ **[1]**

9   The mean score on an IQ test was 100. One participant scored 55, which was much less than the mean. Which of these statements represents this result?

    A $55 \geq 100$

    B $55 \ll 100$

    C $55 = 100$

    D $55 \gg 100$

    Your answer   **[1]**

10   In which section of a practical report would you find details of standardised instructions given to participants?

    A   abstract

    B   appendices

    C   discussion

    D   introduction

    Your answer   **[1]**

11   A researcher calculated a Mann Whitney U test and found a p value of 0.006089.

    What is 0.006089 written to two significant figures?

    A   0.00

    B   0.0060

    C   0.0061

    D   0.61

    Your answer   **[1]**

Section B

Research design and response

A researcher wants to investigate if there is a relationship between how artistic a person is and the tattoos they have on their body. They decided to use the correlation method to investigate this.

12 Suggest a null hypothesis for this correlational investigation.

....

....

....

....

....

....

....

....**[3]**

13 Explain how you would design a correlation study to investigate if there is a relationship between how artistic a person is and the tattoos they have on their body.

You **must** refer to the following required features in your answer:
- the data collection method for the variable 'how artistic a person is'
- how you would attempt to reduce the influence of one extraneous variable
- details of how one ethical consideration would be addressed.

Justify the decisions you have made for each required feature as part of your explanation. **[12]**

....

....

....

....

....

....

....

....

....

....

....

....

....

....

....

....

....

....

....

....

H569/01 **Turn over**

14 Explain **two** weaknesses of using the correlation method to investigate if there is a relationship between how artistic a person is and the tattoos they have on their body.

1 ....

....

....

....

....

....

2 ....

....

....

....

....

.... **[6]**

A researcher wanted to find out more about people's tattoo choices. They decided to use the self-report method. The researcher gave an opportunity sample of 30 participants, recruited in a local shopping centre, a questionnaire that contained 8 fixed-choice questions. The participants completed the questionnaire immediately and handed it back to the researcher.

15 Explain **one** action that the researcher could take to improve the **reliability** of this self-report investigation if they were to carry it out again.

....

....

....

....

....

....

.... **[3]**

16 Explain **one** action that the researcher could take to improve the **validity** of this self-report investigation if they were to carry it out again.

....

....

....

....

....

....

....**[3]**

17 One of the questions asked on the questionnaire was 'Do you regret any of your tattoo choices? Yes ☐ No ☐'

(a) Identify the level of data collected in this question.

.... **[1]**

(b) Identify the appropriate measure of central tendency that would be used to summarise the results for this question.

.... **[1]**

18 You have carried out your own practical investigation using the **observation method**.

(a) Explain **one strength** of the **sampling method** you used to collect participants in your practical investigation using the **observation method**.

....

....

....

....

....

....

....**[3]**

(b) Explain **one weakness** of the **type of data** you collected in your practical investigation using the **observation method**.

....

....

....

....

....

....

....**[3]**

Section C

Data analysis and interpretation

A psychologist wanted to investigate the effects of expectations on people's perception. To investigate this, she needed an image that was ambiguous and could be perceived in more than one way. The psychologist created a black-and-white image which was purposefully drawn so that it could be seen as either a crocodile or a laptop computer. To check that the image could genuinely be perceived in these two ways, the psychologist showed it to participants for one second and instructed them to say what they saw. The participants were all students at the same university. The results are presented below:

Number of times the ambiguous image was perceived as a crocodile	Number of times the ambiguous image was perceived as a laptop computer	Number of times the ambiguous image was perceived as neither a crocodile nor a laptop computer
9	9	2

19

(a) Calculate the percentage number of times the ambiguous image was identified as neither a crocodile nor a laptop computer.

Show your working.

= .... % **[2]**

(b) Sketch a fully labelled bar chart showing the data collected in this investigation.
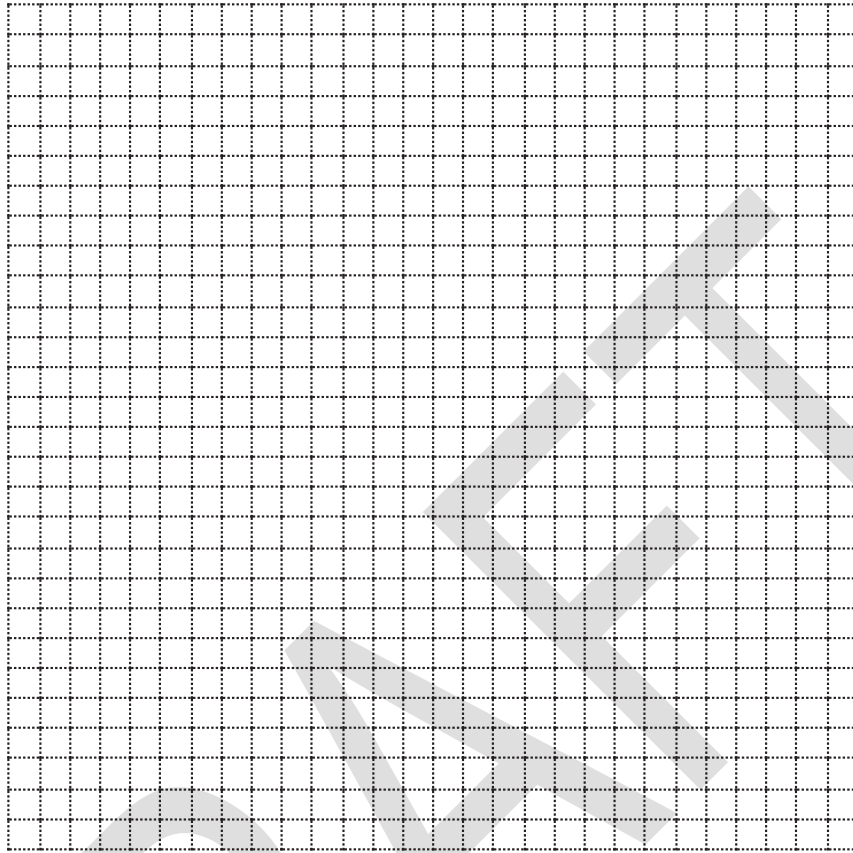
[4]

(c) Outline **one** conclusion that can be made from the data collected in this investigation.

....

....

....

....

....

....

....**[3]**

For the second stage of this investigation, new participants were obtained from the same university as the participants in the first stage of the investigation. However, none of these participants had taken part in the first stage of the investigation.

The participants were split into two separate conditions. In one condition, participants were shown five images of animals, one after the other, and were then shown the ambiguous image. In the other condition, participants were shown five images of electronic devices, one after the other, and were then shown the ambiguous image. All images were in black-and-white. For each image they were shown, participants had to say what they saw.

The results for what they said the ambiguous image represented are shown in the table.

	Number of times the ambiguous image was perceived as a crocodile	Number of times the ambiguous image was perceived as a laptop computer
The ambiguous image was presented after images of animals	15	10
The ambiguous image was presented after images of electronic devices	5	12

20

(a) Calculate the ratio of the number of participants who perceived a crocodile in the first condition and the number who perceived a crocodile in the second condition.

Express your answer in its simplest form.

= .... **[2]**

(b) The psychologist used the Chi-square test to analyse the findings from the second stage of this investigation.

Explain **two** reasons why this was the appropriate non-parametric inferential statistical test to use for this investigation.

1 ....

....

....

....

....

2 ....

....

....

....

....**[4]**

(c) Calculate the degrees of freedom (df) for use with the Chi-square test in this investigation.

Show your working.

= .... df   **[2]**

(d) The calculated Chi-square value is 3.80.

Below is an extract from the table of critical values.

Levels of significance for a one-tailed test	
Significance Level	0.05
Critical Value	2.71

Write a significance statement for the results of this study.

....

....

....

....

....

....

....

....

....

....

....**[4]**

(e) Explain how this investigation demonstrates **one** principle of scientific enquiry.

....

....

....

....

....

....

....**[3]**

(f) Evaluate **two** issues of validity in the second stage of this investigation.

1 ....

....

....

....

....

....

....

2 ....

....

....

....

....

....**[6]**

END OF QUESTION PAPER

ADDITIONAL ANSWER SPACE

If additional space is required, you should use the following lined page(s). The question number(s) must be clearly shown in the margin(s).

....

....

....

....

....

....

....

....

....

....

....

....

....

....

....

....

....

....

....

....

OCR
Oxford Cambridge and RSA

Sample Mark Scheme

A Level Psychology H569/01 Research methods

MARK SCHEME

Duration: 2 hours

MAXIMUM MARK 80

Version: **Sample**

This document has 17 pages

MARKING INSTRUCTIONS

PREPARATION FOR MARKING

MARKING

1.   Mark strictly to the mark scheme.

2.   Marks awarded must relate directly to the marking criteria.

3.   **Crossed Out Responses**
Where a candidate has crossed out a response and provided a clear alternative then the crossed-out response is not marked. Where no alternative response has been provided, examiners may give candidates the benefit of the doubt and mark the crossed-out response where legible.

    Rubric Error Responses – Optional Questions
Where candidates have a choice of question across a whole paper or a whole section and have provided more answers than required, then all responses are marked and the highest mark allowable within the rubric is given. Select the highest mark from those awarded. *(The underlying assumption is that the candidate has penalised themselves by attempting more questions than necessary in the time allowed.)*

    Multiple Choice Question Responses
When a multiple choice question has only a single, correct response and a candidate provides two responses (even if one of these responses is correct), then no mark should be awarded (as it is not possible to determine which was the first response selected by the candidate).

    Contradictory Responses
When a candidate provides contradictory responses, then no mark should be awarded, even if one of the answers is correct.

    Short Answer Questions (requiring only a list by way of a response, usually worth only **one mark per response**)
Where candidates are required to provide a set number of short answer responses then only the set number of responses should be marked. The response space should be marked from left to right on each line and then line by line until the required number of responses have been considered. The remaining responses should not then be marked. Examiners will have to apply judgement as to whether a 'second response' on a line is a development of the 'first response', rather than a separate, discrete response. *(The underlying assumption is that the candidate is attempting to hedge their bets and therefore getting undue benefit rather than engaging with the question and giving the most relevant/correct responses.)*

Short Answer Questions (requiring a more developed response, worth **two or more marks**)
If the candidates are required to provide a description of, say, three items or factors and four items or factors are provided, then mark on a similar basis – that is downwards (as it is unlikely in this situation that a candidate will provide more than one response in each section of the response space.)

Longer Answer Questions (requiring a developed response)
Where candidates have provided two (or more) responses to a medium or high tariff question which only required a single (developed) response and not crossed out the first response, then only the first response should be marked. Examiners will need to apply professional judgement as to whether the second (or a subsequent) response is a 'new start' or simply a poorly expressed continuation of the first response.

4. Always check the pages (and additional objects if present) at the end of the response in case any answers have been continued there. If the candidate has continued an answer there, then add a tick to confirm that the work has been seen.

5. Award No Response (NR) if:
    • there is nothing written in the answer space

    Award Zero '0' if:
    • anything is written in the answer space and is not worthy of credit (this includes text and symbols).

6. For answers marked by levels of response:
    a. **To determine the level** – start at the highest level and work down until you reach the level that matches the answer
    b. **To determine the mark within the level**, consider the following

Descriptor	Award mark
On the borderline of this level and the one below	At bottom of level
Just enough achievement on balance for this level	Above bottom and either below middle or at middle of level (depending on number of marks available)
Meets the criteria but with some slight inconsistency	Above middle and either below top of level or at middle of level (depending on number of marks available)
Consistently meets the criteria for this level	At top of level

7. Subject Specific Marking Instructions

Section A: Multiple choice

Question	Answer	AO	Guidance
1	B	**AO1**	random
2	A	**AO1**	high replicability
3	B	**AO2**	0.04
4	D	**AO1**	test-retest
5	A	**AO1**	Incorrectly accepting the null hypothesis
6	C	**AO1**	Go/No-Go task
7(a)	B	**AO2**	15
7(b)	A	**AO2**	6
7(c)	B	**AO2**	6.93
7(d)	B	**AO2**	Eyesight
7(e)	C	**AO2**	Mann-Whitney U test
8	A	**AO1**	Volume of grey matter in the anterior hippocampus
9	B	**AO2**	55 << 100
10	B	**AO1**	Appendices
11	C	**AO2**	0.0061

Section B: Research design and response

Q12: Suggest a null hypothesis for this correlational investigation. **(3 marks)**	
Marking Criteria (AO2 x 3)	**Guidance**
3 marks: Correctly cited null hypothesis with both variables operationalised.	<u>Example answer:</u> There will be no significant relationship between how artistic a person is (measured by how many artworks they create in a typical year) and the number of tattoos they have on their body.
2 marks: Correctly cited null hypothesis with reference to both variables, but only one operationalised.	
1 mark: Correctly cited null hypothesis with reference to both variables, but neither operationalised.	Each variable must be operationalised to produce ordinal or interval data to be creditworthy.
0 marks: No creditworthy response.	Zero marks for citing an alternative hypothesis or a null hypothesis for an experiment (no credit if any reference to difference/cause/effect).

Q13: Explain how you would design a correlation study to investigate if there is a relationship between how artistic a person is and the tattoos they have on their body.

- the data collection method for the variable 'how artistic a person is'
- how you would attempt to reduce the influence of one extraneous variable
- details of how one ethical consideration would be addressed.

Justify the decisions you have made for each required feature as part of your explanation.

(12 marks)

<table>
<tr>
<th colspan="3">Marking Criteria</th>
<th>Guidance</th>
</tr>
<tr>
<td></td>
<td>AO2 x 6</td>
<td>AO3 x 6</td>
<td rowspan="6">Suggestions for Required Features could include (AO2):
RF1: Any data collection method that would generate quantitative (ordinal/interval) data in this context – e.g. rating scales completed by self or others, etc. Any appropriate response should be credited.

RF2: There are many extraneous variables that could be controlled in this context, including skin conditions people might have (that prevent them from being able to have tattoos), disposable income (to be able to pay for tattoos), availability of tattoo parlours, age of participants (assuming different attitudes towards tattoos among people from different generations), etc. Any appropriate response should be credited.

RF3: Relevant ethical considerations in this context could include gaining informed consent (addressed by briefing participants/informing them of the study aims), withdrawal (addressed by informing participants of their right to withdraw before, during and after the study), reducing any possible affects such as embarrassment over poor artistic ability (addressed via debrief), etc. Any appropriate response should be credited.

<u>Justification for Decisions:</u>
The justification provided will depend on the suggestion made. Examples include:

RF1: If a self-rating scale is used, this could be justified by the fact that participants have a greater level of insight into their own artistic ability than an external observer might, so this could yield more valid data.

RF2: Many suggestions could be justified by the fact that there would be the same experience for all participants in both conditions, increasing validity but also standardisation/replicability if the suggestion is procedural.

RF3: Most suggestions could be justified by the fact that by making the study more ethical, the reputation of psychology will be maintained/improved or that participants would be more likely to participate in future studies.
For all required features, any appropriate justification should be credited.</td>
</tr>
<tr>
<td>Level</td>
<td>The candidate applies knowledge and understanding of scientific ideas, processes, techniques and procedures for the theoretical design of a practical study by:</td>
<td>The candidate analyses, interprets and evaluates scientific information, ideas and evidence to develop and refine practical design through the justification of decisions made by:</td>
</tr>
<tr>
<td>Level 3

(5–6 marks)</td>
<td>Addressing **all three** Required Features (RFs) accurately, in context, and with sufficient clarity and detail to enable replication.</td>
<td>Providing accurate **and** detailed justification, in context, for **all three** design decisions.</td>
</tr>
<tr>
<td>Level 2

(3–4 marks)</td>
<td>Addressing **two** of the Required Features (RFs) accurately, in context, and with sufficient clarity and detail to enable replication.</td>
<td>Providing accurate justification with reasonable detail, in context, for **at least two** of the design decisions.</td>
</tr>
<tr>
<td>Level 1

(1–2 marks)</td>
<td>Addressing **one** or more of the Required Features (RFs) accurately and with sufficient clarity and detail to enable replication.</td>
<td>Providing accurate justification **for at least one** of the design decisions.</td>
</tr>
<tr>
<td>0 marks</td>
<td colspan="2">No creditworthy response.</td>
</tr>
</table>

Q14: Explain **two** weaknesses of using the correlation method to investigate if there is a relationship between how artistic a person is and the tattoos they have on their body. **(6 marks) [3+3]**

Marking Criteria (AO2 x 2, AO3 x 4)	Guidance
For each weakness, candidates will analyse and evaluate the use of the correlational method in order to:	Possible weaknesses:
3 marks: Identify a relevant weakness and explain it in detail in the context of the investigation.	▪ Inability to infer causation due to problems of reverse causation (i.e. whether being artistic causes increased tattoos, or having more tattoos makes you more artistic)
2 marks: Identify a relevant weakness and briefly explain it in the context of the investigation.	▪ Inability to infer causation due to 'third variables' (i.e. whether an unmeasured variable is responsible for the correlation)
1 mark: Identify a weakness relevant (explicit or implied) to the context of the investigation.	▪ Lack of qualitative data/inability to understand reasons for any relationships found.
0 marks: No creditworthy response.	▪ Any other appropriate point.

Q15: Explain **one** action that the researcher could take to improve the **reliability** of this self-report investigation if they were to carry it out again. **(3 marks)**

Marking Criteria (AO3 x 3)	Guidance
3 marks: Relevant action identified and clearly explained (in terms of how it would improve the reliability of the self-report investigation) and explicitly related to the context of this investigation.	Possible improvements: ▪ Ensuring a standardised procedure (to enable replication) ▪ Asking multiple questions about the same construct.
2 marks: Relevant action identified and attempted explanation (in terms of how it would improve the reliability of this second part of the investigation) and explicitly related to the context of this investigation.	▪ Using a larger sample size (to improve confidence in a consistent statistical effect).
1 mark: Relevant action identified (whether explicitly in context of this investigation or not).	▪ Any other appropriate point.
0 marks: No creditworthy response.	**NB. Context is required to access 2 marks or above.**

Q16: Explain **one** action that the researcher could take to improve the **validity** of this self-report investigation if they were to carry it out again. **(3 marks)**

Marking Criteria (AO3 x 3)	Guidance
3 marks: Relevant action identified and clearly explained (in terms of how it would improve the validity of the self-report investigation) and explicitly related to the context of this investigation.	Possible improvements: ▪ Anonymous responses (to reduce social desirability). ▪ Allowing participants to complete the questionnaire at home (so more likely to give a good amount of thought to responses which reflect their true opinions/behaviours).
2 marks: Relevant action identified and attempted explanation (in terms of how it would improve the validity of this second part of the investigation) and explicitly related to the context of this investigation.	▪ Using a larger sample size (to improve likelihood of population validity).
1 mark: Relevant action identified (whether explicitly in context of this investigation or not).	▪ Any other appropriate point.
0 marks: No creditworthy response.	**NB. Context is required to access 2 marks or above.**

Q17 (a): One of the questions asked on the questionnaire was 'Do you regret any of your tattoo choices? Yes ☐   No ☐'
Identify the level of data collected in this question. **(1 mark)**

Marking Criteria (AO2 x 1)	Guidance
1 mark: Stating 'nominal data'.	
0 marks: No creditworthy response.	

Q17 (b): Identify the appropriate measure of central tendency that would be used to summarise the results for this question. **(1 mark)**

Marking Criteria (AO2 x 1)	Guidance
1 mark: Stating 'mode'.	
0 marks: No creditworthy response.	

Q18(a): You have carried out your own practical investigation using the observation method: Explain **one strength** of the **sampling method** you used to collect participants in your practical investigation using the **observation method**. **(3 marks)**

Marking Criteria (AO2 x 1, AO3 x 2)	Guidance
Candidates will analyse and evaluate their own practical investigation when responding to this question.	<u>Example 3-mark answer:</u> As part of my A-level course, I carried out an observation of how people behave on a bus, recording such behaviour as whether they chat with other people, look out of the window, read things on their mobile phone, etc. One strength of the sampling method was that by using an opportunity sample I was able to collect a relatively large sample quickly and easily. This was good because a larger sample means that the conclusions I drew about how people behave on buses can be more generalisable than if a smaller sample was used.
3 marks: A relevant strength is explained in detail in the context of their own clearly described practical investigation that used the observation method.	
2 marks: A relevant strength is briefly explained in the context of their own practical investigation that used the observation method.	
1 mark: A strength is identified in the context of their own practical investigation that used the observation method.	
0 marks: No creditworthy response.	

Q18(b): You have carried out your own practical investigation using the observation method: Explain **one weakness** of the **type of data** you collected in your practical investigation using the **observation method**. **(3 marks)**

Marking Criteria (AO2 x 1, AO3 x 2)	Guidance
Candidates will analyse and evaluate their own practical investigation when responding to this question.	<u>Example 3-mark answer:</u>
3 marks: A relevant weakness is explained in detail in the context of their own clearly described practical investigation that used the observation method.	As part of my A-level course, I carried out an observation of how people behave on a bus, recording such behaviour as whether they chat with other people, look out of the window, read things on their mobile phone, etc. One weakness of collecting quantitative data in this study meant that I
2 marks: A relevant weakness is briefly explained in the context of their own clearly described practical investigation that used the observation method.	did not understand the reasons why people were chatting or using a mobile phone, I only knew how many people did each activity. This means that I did not get a fully valid representation of why people behaved the way they did.
1 mark: A weakness is identified in the context of their own practical investigation that used the observation method.	
0 marks: No creditworthy response.	

Section C: Data analysis and interpretation

Q19(a): Calculate the percentage number of times the ambiguous image was identified as neither a crocodile nor a laptop computer. Show your workings. (2 marks)	
Marking Criteria (AO2 x 2)	**Guidance**
2 marks: Accurate percentage calculated with accurate workings shown.	Example 2-mark answer: 2 ÷ 20 = 0.1 0.1 x 100 = 10 Answer = 10%
1 mark: EITHER accurate percentage calculated (without any workings shown) OR accurate workings shown but no/wrong final answer given.	
0 marks: No creditworthy response.	

Q19(b): Sketch a fully labelled bar chart showing the data collected in this investigation. **(4 marks) [1+1+1+1]**	
Marking Criteria (AO2 x 4)	**Guidance**
1 mark: For including an appropriate title.	 A bar chart to show the frequency of the different ways an ambiguous image was perceived
1 mark: For including appropriate labels on the X axis.	
1 mark: For including appropriate label on the Y axis.	
1 mark: For accurately plotted data (bars in correct proportions to data).	

Q19(c): Outline **one** conclusion that can be made from the data collected in this investigation. **(3 marks)**

Marking Criteria (AO3 x 3)	Guidance
3 marks: Relevant conclusion stated, supported by reference to relevant findings, and plausible explanation given for the conclusion.	Example 3-mark answer: Participants were just as likely to see the ambiguous image as a crocodile as they were to see it as a laptop computer. Nine participants perceived it as a crocodile and nine perceived it as a laptop computer. In part, this could be because the image was in black-and-white, and this could have helped make it more ambiguous than if it had been in colour.
2 marks: Relevant conclusion stated, and EITHER supported by reference to relevant findings OR plausible explanation given for the conclusion.	
1 mark: Relevant conclusion stated, and NEITHER supported by reference to relevant findings NOR plausible explanation given for the conclusion.	
0 marks: No creditworthy response.	

Q20(a): Calculate the ratio of the number of participants who perceived a crocodile in the first condition and the number who perceived a crocodile in the second condition. Express your answer in its simplest form. **(2 marks)**

Marking Criteria (AO2 x 2)	Guidance
2 marks: Accurate ratio identified AND simplified.	Accurate ratio = 15:5 Simplified ratio = 3:1
1 mark: EITHER accurate ratio identified OR simplified ratio only stated.	
0 marks: No creditworthy response.	

Q20(b): The psychologist used the Chi-square test to analyse the findings from the second stage of this investigation. Explain two reasons why this was the appropriate non-parametric inferential statistical test to use for this investigation. **(4 marks) [2+2]**	
Marking Criteria (AO1 x 2, AO2 x 2)	**Guidance**
For each reason: **2 marks:** Accurate reference to the study using independent measures design/test of difference/nominal data, accurately explained in context. **1 mark:** Accurate reference to the study using independent measures design/test of difference/nominal data, but not explained in context. **0 marks:** No creditworthy response.	Reasons for using a Chi-square test: ▪ Independent measures design ▪ Test of difference ▪ Use of nominal data Example 4-mark answer: Chi-square was used because the study had an independent measures design (participants were only in one condition – they saw five images of animals or electronic devices). It also collected nominal data (the frequency of participants perceiving the ambiguous image as either a crocodile or a laptop computer).

Q20(c): Calculate the degrees of freedom for use with the Chi-square test in this investigation. Show your workings. **(2 marks)**	
Marking Criteria (AO2 x 2)	**Guidance**

2 marks: Accurate calculation of degrees of freedom, i.e. the correct answer (1) with accurate workings shown (2-1) x (2-1).	Df = (Number of rows –1) x (Number of columns – 1)
	     = (2-1) x (2-1)
	     = 1

1 mark: EITHER accurate calculation of degrees of freedom, i.e. simply stating the correct answer (1) with no working OR Accurate workings/formula shown e.g. (Number or rows – 1) x (Number of columns – 1) alone without the correct answer (1) stated.	
0 marks: No creditworthy response.	

Q20(d): Write a significance statement for the results of this study. **(4 marks)**	
Marking Criteria (AO2 x 4) [1+1+1+1]	**Guidance**
1 mark: The results are significant at the p<0.05 level.	Context: Refers to significant difference in how many people saw the ambiguous image as either a crocodile or a laptop computer, depending on whether they saw the image after seeing images of either animals or electronic devices.
1 mark: Stating that the calculated value (3.80) is greater than the critical value (2.71).	
1 mark: Therefore, the null hypothesis is rejected.	Accept alternative wording where appropriate, e.g. the critical value (2.71) is less than the calculated value (3.80).
1 mark: For contextualising the statement.	
0 marks: No creditworthy response.	

Q20(e): Explain how this investigation demonstrates **one** principle of scientific enquiry. **(3 marks)**	
Marking Criteria (AO1 x 2, AO2 x 1)	**Guidance**
3 marks: Relevant scientific principle identified and explained in detail in the context of this investigation.	Appropriate scientific principles are as follows:
2 marks: Relevant scientific principle identified and briefly explained in the context of this investigation.	- The study of cause-and-effect - Falsification - Replicability - Objectivity
1 mark: Relevant scientific principle identified (whether in context or not).	- Hypothesis testing - Manipulation of variables - Control and standardisation
0 marks: No creditworthy response.	Quantifiable measurement.

Q20(f): Evaluate **two** issues of validity in the second stage of this investigation. **(6 marks)**		
Level	Marking Criteria (AO2 x 2, AO3 x 4)	Guidance
	Candidates will analyse and evaluate the investigation in order to:	Relevant comments could relate to:
Level 3 (5–6 marks)	Provide clear and detailed evaluation of two issues of validity (strengths and/or weaknesses). Each issue is well-explained in the context of the investigation.	▪ Population validity ▪ Ecological validity ▪ Use of independent measures design (so no risk of order effects) ▪ Controls of extraneous variables
Level 2 (3–4 marks)	Provide evaluation of two issues of validity (strengths and/or weaknesses). Each issue is briefly explained in the context of the investigation, or one issue is well-explained in the context of the investigation.	▪ Demand characteristics ▪ Possibility of participants in the second study talking with participants from the first study ▪ Participant variables
Level 1 (1–2 marks)	Attempt to evaluate validity whether in context or not. Only one issue of validity may be addressed.	▪ The way in which the first part of the investigation had controlled for the ambiguous image resembling a crocodile more than a laptop computer, etc. ▪ Any other appropriate point.

Assessment Objectives Grid

Question	AO1.1a	AO1.1b	AO2.1a	AO2.1b	AO2.1c	AO2.1d	AO2.1e	AO2.1f	AO2.1g	AO2.1h	AO3.1a	AO3.1b	AO3.2a	AO3.2b	Total	Maths Mark	Maths Skill
1		1													1	1	D.1.5
2		1													1		
3								1							1	1	D.0.1
4	1														1		
5	1														1		
6		1													1		
7(a)										1					1	1	D.1.2
7(b)										1					1	1	D.1.6
7(c)										1					1	1	D.1.6
7(d)						1									1		
7(e)										1					1	1	D.1.12
8		1													1		
9						1									1	1	D.2.1
10		1													1		
11									1						1	1	D.1.1
12			3												3		
13			3				3						3	3	12		
14							2				2	2			6		
15													2	1	3		
16													2	1	3		
17(a)						1									1	1	D.1.10
17(b)										1					1	1	D.1.6
18(a)									1			2			3		
18(b)									1			2			3		
19(a)										2					2	1	D.0.2
19(b)										4					4	2	D.1.3
19(c)											1	2			3	3	D.1.3
20(a)										2					2	2	D.0.2
20(b)		2								2					4	2	D.1.12
20(c)										2					2	2	D.2.3
20(d)										4					4	3	D.1.13
20(e)	2				1										3		
20(f)					2						2	2			6		
Totals	4	7	6	0	3	3	5	2	2	21	5	10	7	5	80	25	
Total	11		42								27						