

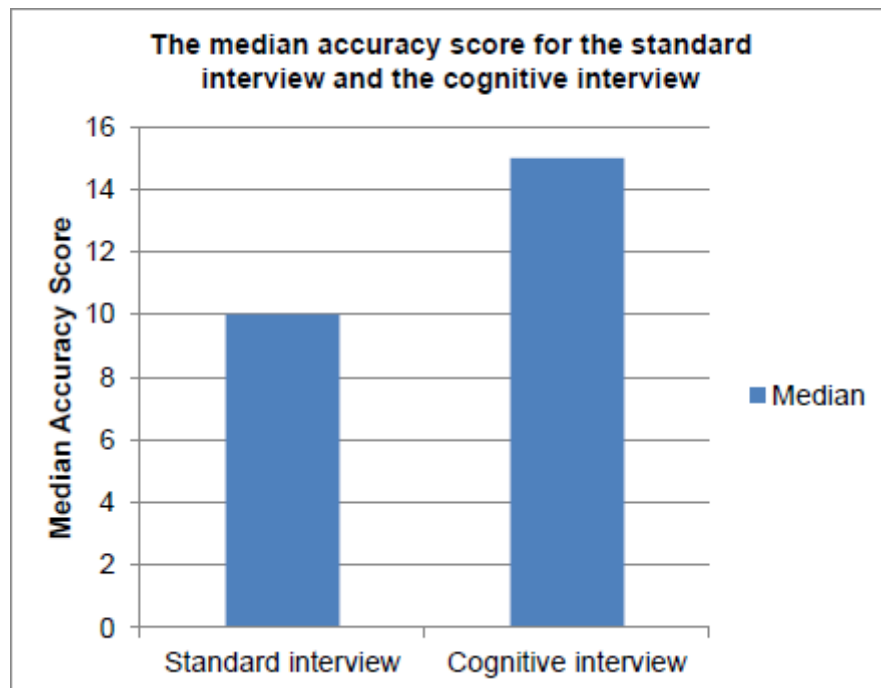
Experimental Methods - Mark Scheme

Q1.

(a) [AO2 = 6]

1 mark for each of the following:

- display as a bar chart
- both axes labelled correctly
- an informative title with reference to the IV and DV
- y axis has appropriate scaling
- bars are separate
- bars are plotted reasonably correctly.



(b) [AO3 = 4]

Award **one mark** for each of the following points:

- the researcher needs to ensure that the two groups are matched for key variables
- example of at least one key variable – any that might reasonably be expected to affect memory in this situation, eg eyesight, age, intelligence
- all participants should be pre-tested / assessed for the key variable / variables
- for each person in one condition, the researcher should assign a 'matched' person in the other condition.

Credit other relevant points or this information embedded in the example.

Q2.

(a) [AO1 = 1 AO3 = 2]

1 mark for identification of the correct experimental design – independent groups / independent measures.

Plus

2 marks for a clear and coherent outline of an advantage using appropriate terminology.

OR

1 mark for a brief / vague / muddled outline of an advantage.

Possible advantages:

- performances not affected by order effects as people only do one condition
- demand characteristics less likely as participants only aware of own condition
- same task / materials can be used in both conditions as participants are always naïve to the task.

Credit other relevant advantages.

(b) [AO1 = 2]

2 marks for a clear and coherent outline of how participants are used in either a repeated measure or a matched pairs design.

1 mark for a vague, muddled or incomplete outline of a repeated measure or a matched pairs design.

If the answer to **(a)** is incorrect, credit a different design to that given.

(c) [AO3 = 2]

1 mark for an appropriate and plausible suggestion.

Plus

1 mark for an appropriate justification.

Likely suggestions:

- testing all participants in the same room
- making sure that all participants hear the same instructions
- ensuring that all participants are tested by the same researcher.

Credit other relevant suggestions.

(d) [AO2 = 3]

3 marks for an appropriate non-directional (or directional) operationalised hypothesis: 'There is a difference in the number of ideas generated when participants work alone and when they work in groups.'

2 marks for a statement with both conditions of the IV and DV that lacks the clarity or has only one variable operationalised.

1 mark for a muddled statement with both conditions of the IV and DV where neither variable is operationalised.

0 marks for expressions of aim / questions / correlational hypotheses or statements with only one condition.

Full credit can be awarded for a hypothesis expressed in a null form.

(e) **[AO2 = 1]**

1 mark: 3 (in each group)

(f) **[AO1 = 1]**

1 mark for naming a suitable measure of dispersion (range or standard deviation).

(g) **[AO2 = 1]**

1 mark for stating that the statistic calculated (either the range or the SD) would be greater in **Condition A** than in **Condition B**.

or written as

1 mark for stating that the statistic calculated (either the range or the SD) would be less in **Condition B** than in **Condition A**.

(h) **[AO2 = 3]**

Marks for a clear description of a practical way as follows:

1 mark – all the participants allocated a number from 1 to 15.

1 mark – the 15 numbers are put in a hat.

1 mark – assign first three numbers drawn to a group and repeat process for other 4 groups.

Accept other valid descriptions that would be practical and produce the same outcome.

(i) **[AO3 = 2]**

1 mark : for each condition, the overall number of ideas generated should be divided by the overall total of 185.

Plus

1 mark : the result for each condition should then be multiplied by 100 to give the percentage.

(j) [AO2 = 6]

Level	Marks	Description
3	5 – 6	Both elements of required content are clear and mostly well detailed. The debrief is all in verbatim format.
2	3 – 4	Both elements of required content are present. The answer lacks detail and / or clarity in places. Some of the answer is in verbatim format.
1	1 – 2	There is some information about at least one element of required content. The answer lacks clarity. Verbatim format is lacking. For one mark there must be some relevant content, eg an optional point about ethics.
	0	No relevant content.

Required content:

- explanation of the aim: to see if creativity is affected by the presence or absence of others
- information about the other condition – in an independent design people need to know about the condition in which they did not take part.

Optional content:

- specific ethical issues, eg right to withdraw data / be informed of results / check of welfare
- general ethical considerations, eg respect for participants.

Q3.

(a) [AO2 = 1]

1 mark C

(b) [AO2 = 2]

1 mark 4/5^{ths}

1 mark for workings 16 divided by 4 = 4 and 20 divided by 4 = 5 (so 4/5^{ths})

(c) [AO3 = 2]

2 marks for a clear and coherent conclusion, plus relevant explanation based on the data.

1 mark for a vague/muddled conclusion.

Conclusion and explanation:

The training course appears to have a beneficial effect on teacher confidence as the majority of them (16 out of 20) say their confidence has improved.

(d) **[AO2 = 2]**

2 marks for a clearly operationalised dependent variable: the DV is whether the teachers thought their confidence in managing difficult behaviour was better, worse or the same after the course.

1 mark for a dependent variable that is not fully operationalised eg teachers' confidence/how they felt after doing the course.

(e) **[AO2 = 3]**

1 mark repeated measures design

Plus

2 marks for a clear and coherent explanation of why this design is appropriate in this case

1 mark for a vague or muddled explanation of why this design is appropriate in this case

Content:

It is important to ask the same participants to consider their level of confidence before and after taking part in the training in order to see whether their confidence has changed. It would not make sense to ask one group of people before training and another group of people after training because there may be individual differences in their levels of confidence anyway.

(f) **[AO2 = 3]**

1 mark calculated value of $S = 2$

Plus two marks for any two of the following points:

1 mark this is determined by converting the differences or outcomes to signs + or –

1 mark then taking the numerical value for/number of participants with the least common/frequent sign

1 mark any nil differences are ignored

(g) **[AO1 = 2]**

2 marks for a clear and coherent explanation

1 mark for a vague/muddled explanation

Content:

researchers use statistical tests to determine the likelihood that the effect/difference/relationship they have found has occurred due to chance.

(h) **[AO3 = 2]**

1 mark for each valid behavioural category suggested.

For credit the behaviour should be an **observable** behaviour that is disruptive or disobedient and would be likely to occur in a primary school classroom eg throwing something, shouting, banging on the desk.

(i) **[AO3 = 3]**

Award marks for a suitable record sheet/tally chart in table form.

1 mark for each bullet point addressed

- Table with spaces for tallies/recordings of instances
- Separate spaces for first and last 10 minutes
- Headed correctly with the six category spaces (may include the two used in answer to part (h) but names of categories not essential here)

No marks for drawing a bar chart or graph.

(j) **[AO3 = 4]**

Level	Marks	Description
2	3 – 4	A relevant problem is clearly identified. The explanation of how the observation would be improved by addressing this problem is appropriate and effective. The answer is generally coherent with effective use of appropriate terminology.
1	1 – 2	A relevant problem is identified. There is partial/limited explanation of how the observation would be improved by addressing this problem. The answer lacks coherence and use of appropriate terminology.
	0	No relevant content.

Relevant problems:

- observer effect (as observation is overt) means pupils would behave differently because they are aware that they are being observed – could be addressed by carrying out a covert observation
- observer bias/lack of objectivity because the researcher is working alone – could be addressed by working as part of a pair for inter-observer reliability
- limiting observations to first and last 10 minutes means the data may not be a valid representation of disruptive behaviour in lessons. Need to carry out observations at other times during the lesson too.

Q4.

(a) **[AO2 = 2]**

2 marks for identification of dependent variable operationalised: number of verbal errors.

1 mark for dependent variable not operationalised: verbal errors or fluency or mistakes.

(b) **[AO2 = 3]**

3 marks for an appropriate non-directional (or directional) operationalised hypothesis:

‘There is a difference in number of verbal errors made by participants who perceive / think / believe there are 5 listeners (there is a small audience) and by participants who perceive / think / believe there are 100 listeners (there is a large audience)’.

2 marks for a statement with both conditions of the IV and a DV that lacks clarity or has only one variable operationalised.

1 mark for a muddled statement with both conditions of the IV and a DV where neither variable is operationalised.

0 marks for expressions of aim / questions / correlational hypotheses or statements with only one condition.

Full credit can be awarded for a hypothesis expressed in a null form.

(c) **[AO2 = 3]**

1 mark for identification of **one** appropriate extraneous variable.

Plus

2 marks for explanation of why the variable should have been controlled – for full marks this should include clear explanation of how it would have affected the DV. Award one mark only for muddled or incomplete explanations, eg unelaborated reference to ‘avoiding confounding’.

Appropriate variables: can be controlled and need to stay constant to avoid affecting the dependent variable, eg same article / conditions / instructions for each participant.

Do not credit gender (this is controlled) or time to complete task (cannot be controlled).

(d) **[AO2 = 2]**

2 marks for clear and coherent explanation of one advantage of using a stratified sample in this study.

1 mark for a muddled answer with a relevant advantage and some explanation in relation to the study.

Possible advantage: ensures that this sample is truly representative because different types of people (males / females) working in this company are represented in the sample in the correct proportions.

Accept other relevant advantages.

(e) **[AO2 = 3]**

1 mark for each point as follows:

Manual method:

- put all 60 male names in a hat (or similar)
- determine the proportion of males needed to mirror the number of males in the target population as follows: 60%
- calculate 60% of 20 = 12 and draw out 12 names.

Random number table or computer method:

- assign each of the 60 men a number between 1 and 60
- determine the proportion of males needed to mirror the number of males in the target population as follows: 60%
- calculate 60% of 20 = 12 and moving horizontally or vertically through random number tables find 12 numbers between 1 and 60 for the sample **OR** generate 12 numbers between 1 and 60 using random number generation function on computer.

(f) **[AO2 = 4]**

Marks for a clear description of a practical way of randomly allocating the 12 men and 8 women to the two conditions as follows:

- give each man a number 1 – 12 (1 mark)
- put 12 numbers in a hat (1 mark)
- assign first six numbers drawn to Condition A with the remainder for Condition B (1 mark)
- repeat process for women – eight numbers in the hat and draw four for Condition A and remaining four go to Condition B (1 mark).

Accept other valid descriptions that would be practical and produce the same outcome.

Q5.

Please note that the AOs for the new AQA Specification (Sept 2015 onwards) have changed. Under the new Specification the following system of AOs applies:

- AO1 knowledge and understanding
- AO2 application (of psychological knowledge)
- AO3 evaluation, analysis, interpretation.

(a) **AO3 = 2**

One aim of the investigation is to see if the age of participants affects their ability to identify a person.

(Credit relevant alternatives)

1 mark for a very brief or muddled aim eg to investigate whether participants can identify a man in a photograph or to investigate EWT or to investigate memory. For 2 marks the aim must be more detailed eg to investigate the effect on EWT or to investigate EWT in a natural setting.

(b) **AO3 = 2**

Participants are less likely to show demand characteristics because in the first part

of the experiment they are unaware they are taking part and so are likely to respond more genuinely. In real life settings research has high validity because the findings can be generalised to other similar situations. It is therefore more likely to be relevant to eyewitness testimony in court cases.

1 mark for a very brief or muddled answer eg high ecological validity.

2 marks for accurate elaboration.

(c) **AO3 = 4**

Opportunity sample 1 mark. Volunteer or random = 0 marks.

One limitation is the lack of a target population. This means that the sample is not representative of any population so there are problems in generalising the findings.

However, selecting participants for availability is an appropriate way to select a sample when no names are available. Comparison with alternative sampling methods is creditworthy. 1 mark for identifying a limitation or advantage eg biased sampling. Further marks for accurate elaboration or identification of further limitations / advantages. Candidates may refer to one or more limitations, advantages or both. Candidates who identify the sample incorrectly can still gain marks for correct evaluation of opportunity sampling.

(d) **AO3 = 4**

Extraneous variables are anything other than the independent variable that could affect the dependent variable. In this study they could include situational variables such as how the researcher asked for directions or time of day, and participant variables such as gender or eyesight.

1 mark for identification of any possible extraneous variable in this study. Eg One possible extraneous variable is the length of time the researcher spends with each participant.

3 marks for accurate explanation of how this variable could have affected this study. This might have affected the results of this study because old people are more likely to have time to stop and chat than younger participants. They therefore spend longer giving directions and would therefore find it easier to identify the researcher.

1 mark for very brief or slightly muddled explanation.

Further marks for accurate elaboration.

Q6.

Please note that the AOs for the new AQA Specification (Sept 2015 onwards) have changed. Under the new Specification the following system of AOs applies:

- AO1 knowledge and understanding
- AO2 application (of psychological knowledge)
- AO3 evaluation, analysis, interpretation.

AO2 / AO3 = 10

Candidates are required to design an experiment to test the effects of different kinds of music on concentration. Examiners need to ensure that they read the completed answer thoroughly before starting to award marks.

Candidates are directed to three pieces of material which should be included within their proposed design. They are required to:

- Operationalise the independent and dependent variables

- Provide details of how they would control extraneous variables
- Describe the procedure they would use with sufficient detail for the study to be carried out.

Candidates are told that they **must** use a repeated measures design. If they do not, they can only access marks for the IV and DV.

In this experiment:

IV and DV – 2 marks

- The independent variable is type of music (for example classical and rock). Candidates should suggest two different types of music.
- The dependent variable is a measurement of concentration. Candidates can use the suggested word search task but must state how it is to be measured (for example, time taken to complete a word search or number of errors made). Alternatively, candidates may suggest their own DV.

Award one mark for operationalising each variable.

Controls – 4 marks

An important element in a repeated measures design is the control of order effects.

- Counterbalancing is the most likely procedure to control order effects. Half of the participants should carry out the 1st concentration task with music 1 followed by the 2nd task with music 2. The other half should complete the concentration task with music 2 first and follow this with music 1.
- The two concentration tasks should be matched for difficulty.
- Alternatively candidates could argue for randomisation or a time delay between the tasks.

Other relevant controls eg volume of music, time allocated for task should be credited. Answers which make no reference to the control of order effects maximum 2 marks.

Procedure – 4 marks

Procedural information should provide detail of how to go about conducting the study (ie what participants are required to do). Candidates could approach this task at a macro level ie from getting consent to debriefing or at a micro level ie the specific procedure for one participant. Other creditworthy material could include:

- Dealing with ethical issues
- Sampling
- Details of conditions and allocation to them
- Standardised instructions
- Data collected.

Note: there are only 4 marks available for the procedure and therefore candidates do not

need to address all of the above to gain full credit.

Q7.

Please note that the AOs for the new AQA Specification (Sept 2015 onwards) have changed. Under the new Specification the following system of AOs applies:

- AO1 knowledge and understanding
- AO2 application (of psychological knowledge)
- AO3 evaluation, analysis, interpretation.

Although the essential content for this mark scheme remains the same, mark schemes for the new AQA Specification (Sept 2015 onwards) take a different format as follows:

- A single set of numbered levels (formerly bands) to cover all skills
- Content appears as a bulleted list
- No IDA expectation in A Level essays, however, credit for references to issues, debates and approaches where relevant.

(a) [AO3 = 2]

For two marks, a clear, testable statement containing both conditions of the IV and an operationalised DV.

For one mark, a statement containing both conditions of the IV and a DV.

No marks for expressions of aim, questions, correlational hypotheses or statements without two conditions.

Possible answers:

Directional: Participants will successfully shoot more netballs through the hoop in the presence of an audience than in the absence of an audience.

Note: Also accept a directional hypothesis opposite to the above.

Non-directional: There will be a difference in the number of netballs successfully shot through the hoop for participants who perform in the presence of an audience and participants who perform in the absence of an audience.

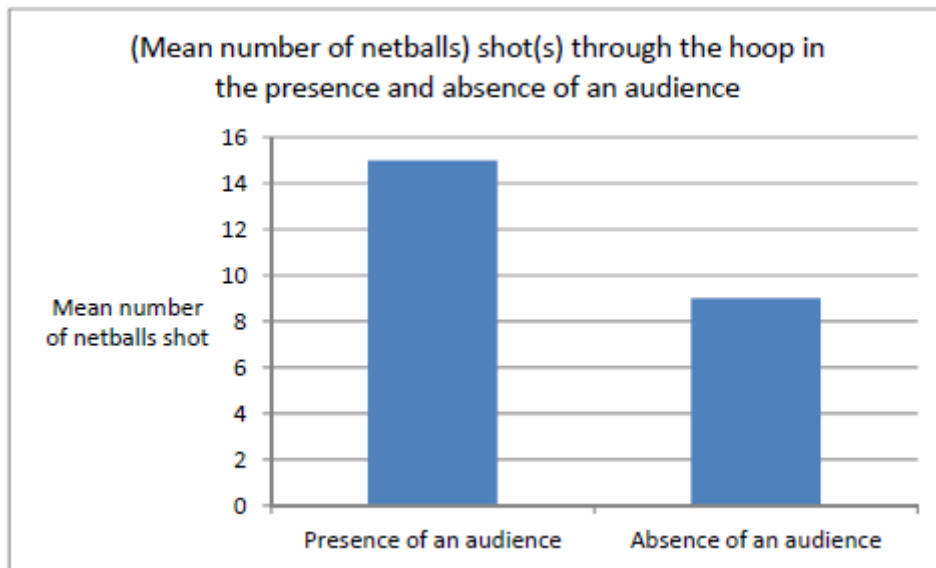
Credit null hypothesis.

(b) [AO3 = 2]

One mark for an appropriate conclusion eg the presence of an audience has a positive effect on the performance of the task (or similar response) (AO3, 1).

One mark for the justification of the response eg the mean number of netballs successfully shot through the hoop is higher when there is an audience than when there is no audience (or similar response) (AO3, 1).

(c) **[AO3 = 3]**



To gain the maximum three marks, candidates must provide the following:

- An appropriate title for the graphical display
- Appropriate axes and labelled eg presence / absence of an audience
- Plotting of data using a sensible scale / no penalty for joined bars.

Line graphs can be credited for title and axes only.

(d) **[AO3 = 2]**

One mark for a relevant strength.
One mark for how / why it is a strength.

Likely strengths: more likely to be representative of the target population; able to generalise to the target population; to exclude researcher bias etc.

(e) (i) **[AO3 = 2]**

One mark for a relevant limitation of an independent groups design.
One mark for how / why in relation to this study eg individual differences in ability / height etc.

(ii) **[AO3 = 2]**

Up to two marks for an appropriate explanation of how the problem may have been overcome.

Possible answer: Using a repeated measures design (1) plus explanation of how this could be done or why this would improve the study.

Credit answers that refer to matched pairs / need for random allocation.

Can credit (ii) in respect of incorrect answer to (i).

(f) (i) **[AO3 = 1]**

One mark for correct knowledge of the term.

Possible answer: A variable other than the independent variable or an additional / or another variable that might have an effect on the dependent variable, only accept the word 'results' for DV (1).

(ii) **[AO3 = 2]**

One mark for stating that if EVs are not controlled for, then the results may be confounded (1) the researcher does not know what is causing the effect (1) or other suitable expansion eg effect on reliability or validity.

Do not accept - results will not be accurate.

Credit answers that refer to the study by way of illustration.

(g) **[AO3 = 4]**

Instruction must be written verbatim for more than 1 mark.

- | | |
|------------------|---|
| Essential points | - reference to presence of audience
- reference to shooting (hoops) throwing (hoops) |
| Optional | - where to stand
- ethics
- introduction of self |

4 marks	Both essential and at least one optional point addressed clearly such that completion of the task in the experimental condition would be easily possible. Information should be clear, relevant, sensible and logically structured. Must be verbatim.
3 marks	Both essential points are addressed such that completion of the task in the experimental condition would be relatively easy. There may be deficiencies in clarity, some irrelevance, illogical sequencing or inappropriate content. Must be verbatim.
2 marks	Any two points are addressed. There may be omissions / irrelevancies / muddle such that completion of the task would be very difficult. Must be verbatim.
1 marks	There must be at least one relevant point (optional or essential). Information may be unclear / inappropriate / irrelevant / muddled such that completion of the task would be very difficult.
0 marks	No relevant information. Completion of the task would not be possible.

NB 2 - 4 marks = Verbatim Instructions

Q8.

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- AO2 application (of psychological knowledge)
- AO3 evaluation, analysis, interpretation.

(a) AO3 = 2

0 marks for a non-directional or correlational hypothesis.

The DV in this experiment is number of pictures correctly identified. Hypotheses where the DV is incorrect (eg number of participants who identified 10 pictures) = 0 marks.

1 mark if not fully operationalised, eg Participants who used the memory improvement strategy did better.

2 marks Participants who use a memory improvement strategy will correctly identify more pictures / objects than participants who do not use a memory improvement strategy.

(b) AO3 = 1

In an independent groups design a different group of participants is used in each condition.

1 mark = Different participants / people in each condition / group

Different / separate groups

Random allocation to groups / conditions.

0 marks = Different / separate conditions

Independent participants / people

Different experiments.

(c) AO3 = 2 + 2

Strength

The participants are naïve because they take part in only one condition, so are less likely to show demand characteristics. There are no order effects such as practice or fatigue because participants take part in one condition.

Limitation

Individual variation, because there are different participants in each condition. More participants are needed than if a repeated measures design was used.

In each case 1 mark for very brief or slightly muddled strength or limitation, 2nd mark for appropriate elaboration of explanation.

0 marks for simply stating there are different participants in each condition.

(d) **AO3 = 3**

A pilot study is used to check aspects of the research such as whether participants understand standardised instructions, whether timings are adequate etc. It allows the researcher to try out the study with a few participants so that adjustments can be made before the main study, so saving time and money.

1 mark for a very brief explanation. Further marks for appropriate elaboration or identification of other reasons. Eg

To check it works. 1 mark

To check the standardised instructions are clear. 2 marks

To check the standardised instructions are clear enough for the participants to understand what they are required to do in the experiment. 3 marks

This question requires an explanation of why a pilot study was used, so a description of what a pilot study is (small scale study carried out before the main research) is not credit-worthy on its own. Candidates do not have to refer to a specific aspect of this experiment.

However, to gain full marks the answer must be relevant, so reference to checking sound levels for example would not be relevant.

(e) **AO3 = 2**

The standard deviation (spread of scores) is larger in the condition with the memory improvement strategy.

Candidates who use the word 'range' to suggest spread should be credited.

1 mark The standard deviation is larger in the condition with the memory improvement strategy.

2 marks The data shows the dispersion or spread of scores is larger in the condition with the memory improvement strategy.

Q9.

Please note that the AOs for the new AQA Specification (Sept 2015 onwards) have changed. Under the new Specification the following system of AOs applies:

- AO1 knowledge and understanding
- AO2 application (of psychological knowledge)
- AO3 evaluation, analysis, interpretation.

Although the essential content for this mark scheme remains the same, mark schemes for the new AQA Specification (Sept 2015 onwards) take a different format as follows:

- A single set of numbered levels (formerly bands) to cover all skills
- Content appears as a bulleted list
- No IDA expectation in A Level essays, however, credit for references to issues, debates and approaches where relevant.

(a) **AO2 / AO3 = 2**

They wanted to clarify some of the issues raised by previous research where some studies had shown that red facilitated tasks and other studies had shown the

opposite. They believed that one way to reconcile these different findings was to look at particular cognitive tasks eg ones which required attention to detail and to compare them with tasks which tap into very different skills eg creativity and thus to narrow down the benefits of providing red backgrounds.

One mark for a brief answer eg 'they wanted to investigate the effects of colour on performance.' One further mark for elaboration, in relation to colour and / or performance.

(b) **AO1 = 2**

Candidates need to show understanding of reporting conventions. The introduction is an important part of the report that provides background information on theories and studies relevant to the investigation. One mark for a brief explanation of the purpose eg 'It provides background information', and one further mark for elaboration or for other detail such as reviewing methodological issues or how the current aims / hypothesis were derived.

(c) **AO1 = 1**

In this question, candidates are not required to relate validity to this particular study so a general definition of validity is acceptable. Definitions of specific types of validity (eg population validity) can also gain credit.

Validity refers to how well a test or a piece of research measures what it says it measures = 1 mark.

Answers such as 'truth' or 'whether it is true' 'legitimacy' or 'accuracy' = 0 marks.

(d) **AO2 / AO3 = 2**

The Canadian researchers who actually undertook this study suggested the following possible practical applications:

- to help decide what colour to pick for an educational facility
- to help decide what colour enhances persuasion in a consumption context
- to help decided what colour enhances creativity in a new product design process.

Any plausible practical applications are credit-worthy.

1 mark for identifying an application and 1 further mark for elaboration.

'You could use particular colours for pages in textbooks' = 1 mark.

'Red might be used in textbooks covering analytical subjects like maths' = 2 marks.

(e) **AO2 / AO3 = 2**

If the researchers had judged the toys themselves, they might have been biased in favour of their hypothesis. There are no objective criteria for what makes a toy either practical or original.

Independent judges would be able to decide between themselves on a set of criteria and then apply them to the toys made by the participants.

Some candidates might interpret 'independent judges' in this question to mean judges who do not confer with one another. In this case, an acceptable answer would be that they could not conform with one another when making their judgement.

One mark for a brief explanation, eg to avoid experimenter bias, and one further mark for elaboration, eg if the researchers judged the toys themselves. An answer explaining the value of rating the toys should be credited.

(f) **AO2 / AO3 = 5**

Candidates need to use the details in the description of the study to write an appropriate set of instructions for potential participants.

The instructions should be clear and succinct. They must:

- explain the procedures of this study relevant to participants
- include a check of understanding of instructions.

They should also use language appropriate for a formal document and be as straightforward and courteous as possible.

This is not a consent form so explicit references to ethical considerations are not necessary for full marks. However, it is perfectly acceptable to include comments such as 'you are free to withdraw from the study at any time.'

AO3 Mark Bands
5 marks Effective The standardised instructions provide accurate detail of the procedure and go beyond the information given in the question eg provide details of time allowed.
4 – 3 marks Reasonable The standardised instructions provide sufficient detail of the procedure in a reasonably clear form.
2 marks Basic The standardised instructions provide some details of the procedure though these may not be clear.
1 mark Rudimentary The standardised instructions provide few details of the procedure and may be muddled and or inaccurate. Omissions in the instructions compromise the procedure.
0 marks No creditworthy material is presented.