2021

AP CollegeBoard

AP® Psychology

Sample Student Responses and Scoring Commentary Set 2

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Free Response Question 2

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Question 2: Research Design — 7 points

General Considerations

1. Answers must be cogent enough for the student's meaning to come through. Spelling and grammatical mistakes do not reduce a student's score, but spelling must be close enough so that the reader is convinced of the word.
2. A student can earn points only if the student clearly conveys what part of the question is being answered. It is possible to infer the part of the question being answered if it is consistent with the order of the question.
3. The response must apply the concept to the prompt; a definition alone will not earn the point.
4. Examples provided in the Scoring Guidelines for each of the points are not to be considered exhaustive.
5. Within a bulleted question part, a student will not be penalized for misinformation unless it *directly contradicts* correct information that would otherwise have earned a point. For example, if a response applies a concept in two contradictory ways (such as identifying both the measured variables as the independent variable or describing proactive interference as interference from both older and newer information), the point is not earned.
6. Within a bulleted question part, if the response addresses details from a scenario other than the one in the prompt, the point is not earned.

Dr. Jones was doing a formal research study of the effect of mental imagery on memory. She randomly assigned students in the psychology course she was teaching into two groups and required them to complete the task as part of their coursework. Forty students were in each group. Each group was presented the same list of 30-word pairs (e.g., tree/book, house/street, friend/cat). Group A was told to form a mental image for each pair. Group B was not given that instruction. Each group was given two minutes to memorize the pairs of words. Dr. Jones then tested their recall of the list by giving each group the first word and asking them to remember the second word. Dr. Jones recorded the number of words recalled by each group and then debriefed the participants. The results are presented in the table below.

	Group A	**Group B**
Mean Number of Words Recalled	**25**	**10**
Standard Deviation	**4**	**6**

Identify the independent variable presented in the study. **1 point**

The response must indicate that the independent variable is the use of mental imagery or the instruction to use mental imagery.

Acceptable explanations include:

- *The independent variable is the students being told to form a mental image.*
- *The independent variable is mental imagery.*

Unacceptable explanations include:

- *The independent variable is the students.*

Identify the control group **1 point**

The response must indicate that the control group is the group that was not told to use mental imagery.

OR

The response must indicate that the group that did not receive the independent variable was Group B.

Acceptable explanations include:

- *The control group is the group not being told to form a mental image.*
- *The control group is Group B.*

Unacceptable explanations include:

- *The control group is Group A.*

Explain why the type of research design being used is appropriate for the study. **1 point**

The response must indicate that the design is appropriate because it is an experiment.

AND

The response must indicate that the design is appropriate because it is trying to show cause and effect.

Acceptable explanations include:

- *The only research design that shows a cause-and-effect relationship is an experiment, so that is why the researcher chose this.*
- *This design uses the experimental method because you can manipulate one variable (type of instruction) to affect another (remembering the words).*

Unacceptable explanations include:

- *The study was appropriate because the researcher used double-blind techniques.*

Explain what the different standard deviations indicate about the data from the two groups. **1 point**

The response must indicate that the scores in Group B varied more than the scores in Group A.

OR

The response must indicate that the scores in Group A varied less than the scores in Group B.

Acceptable explanations include:

- *The standard deviation from Group B is higher than in Group A, so the scores in Group B were more different from each other than those in Group A.*
- *Group A had scores that were more similar to each other than Group B.*

Unacceptable explanations include:

- *The standard deviations were different because Group A had more scores than Group B.*

Explain the ethical flaw that is explicitly presented in the scenario. **1 point**

The response must indicate that the researcher required the students to participate.

Acceptable explanations include:

- *Participation should be voluntary.*
- *The researcher failed to obtain informed consent.*

Unacceptable explanations include:

Responses that indicate any other ethical flaws do not score.

- *The researcher needed to guarantee that no harm would come to the students in this study.*

Explain how the primacy effect could apply to this research. **1 point**

The response must indicate that if the primacy effect took place, the students would remember more of the words they heard at the beginning of the list than they did from other parts of the list.

Acceptable explanations include:

- *If students remember more words at the beginning of the list, then they have demonstrated the primacy effect.*

Unacceptable explanations include:

Describing serial position effect alone is not sufficient.

Describing primacy and recency without **accurately** identifying primacy does not score.

- *The students remembered the words better if they studied them earlier.*

Explain how levels of processing are related to this research. **1 point**

The response must indicate that students who did better/Group A used deep processing or that students who did worse/Group B used shallow processing.

OR

The response must correctly relate mental imagery to deep processing.

Acceptable explanations include:

- *Students used mental imagery which allowed them to process the words deeply.*
- *The students who had no instructions did worse because they used shallow processing.*

Unacceptable explanations include:

- *The researcher was interested in examining how mental imagery helps people.*
- *The mental imagery group used semantic encoding and did better.*

Total for question 2 **7 points**

Question 1 **Question 2**

○ ●

Begin your response to each question at the top of a new page. Do not skip lines.

- The independent variable (the variable whose effect is being studied), presented in the study was the instruction to form a mental image for each pair of words.
- The control group, the group not exposed to the independent variable, was Group B
- This research design is an experiment, and it is appropriate for this study because Doctor Jones wants to study the effect of a variable (mental imagery) and experiments allow her to manipulate variables and conclude a cause-and-effect relationship.
- ~~The difference in standard deviations mean~~ Group A has a standard deviation of 4 and Group B has a standard deviation of 6. The different standard deviations indicate that Group B's results varied more from the mean score than Group A's results
- The ethical flaw presented in the scenario is that the students were required to participate in the study as a part of their coursework. Subjects cannot be forced or required to take part in experiments as it is ~~unethical~~ unfair and unethical, it must be voluntary and they must give informed consent.
- The primacy effect states that it is easier to remember the first words or objects that are presented. This effect can be applied to the study because it makes it more likely for the subjects to remember the first few word pairs that are provided. Therefore, it might not be the mental imagery, but the primacy effect that allows them to recall the words.
- Levels of processing relate to this research because the students who formed mental images used deep processing while those who didn't form mental images utilized shallow processing. Deep processing allows the subjects to recall the information more readily and memorize easily.

Q2 Sample 2B 1 of 2

Question 1 Question 2

Begin your response to each question at the top of a new page. Do not skip lines.

The independent variable is the variable that is manipulated in the experiment. Here, the independent variable is whether or not the groups are asked to form mental images after seeing the word pairs. The control group is the group in an experiment that nothing happens to that serves as a basis of comparison to the experimental group. Here, that would be the group not given the instruction to form a mental image when thinking about the word pairs., which is Group B. The type of research being done here is an experiment, or a research method that allows the cause and effect ratio between variables to be easily seen. This is the best research design because it allows Dr. Jones to easily see the relationship between variables, and it allows her to manipulate them as she wishes. Standard deviations represent the distribution of data around the mean. Group A's 4 deviations shows that the data did not deviate as much as Group B's with 6. Thus, Group A's was more closely clustered around the average and they remembered more words on average than Group B. The ethical flaw of this experiment is how Dr. Jones does not allow participants to withdraw from the research if they wish. She requires them to complete the task as part of their coursework. This does not insure that participants could stop participating if they felt the task violated them. Fundamentally, Dr. Jones forces them to carry out the task. The primary effect is the idea that

Question 1 **Question 2**

○ ●

Begin your response to each question at the top of a new page. Do not skip lines.

something is easier when you have done or seen it before. For this experiment, prior knowledge of the words or a similar experiment may have made it easier for Group A or Group B to remember, or not remember, as they performed. The levels of processing related to this experiment a encoding and retrieval. Encoding is committing something to memory, and retrieval is getting that knowledge out and using it. Here, pictures and mental images allowed the words to be more efficiently encoded for Group A. Mental images magnified the scope of it. Because of this efficient encoding, Group A could also ~~[illegible]~~ retrieve this information more readily, hence their greater tendency to remember ~~[illegible]~~ associated words.

Question 1 Question 2

Begin your response to each question at the top of a new page. Do not skip lines.

An independent Variable is the part in the experiment that can change. The independent Variable in this Study was the mental image Group A was presented.

A Control group is a group that is controlled, which is Group A.

The research design being used in this Study is random assignment. This type of way is appropriate because, Some peoples memory/ Visual memory may be better than others Chosen in this Study.

Standard Deviation is the Standard number plotted in the experiment. Group A's Standard deviation is lower because, Group B was not given the instruction to form a mental image for each pair.

The ethical Flaw presented in this Study would be that every individual has better/or worse memory than another individual in the Study, and the way we process things are all different.

Levels of Processing means the level at which Someone processes Something. In this research Study it relates because, the way 1 person visually processes Something may be different from the next.

Question 2

Note: Student samples are quoted verbatim and may contain spelling and grammatical errors.

Overview

The responses were expected to demonstrate an understanding of characteristics of an experiment and to show how specific psychological terminology applies to the scenario. The responses needed to address a psychologist's research project on memory. They also needed to demonstrate understanding of the independent variable, the control group in an experiment, that experiments can result in causal conclusions, the spread of scores in a distribution, and ethical considerations in research participation. Additionally, the responses needed to demonstrate knowledge of specific concepts within memory, primacy effect and depth of processing.

Sample: 2A
Score: 7

The response earned point 1 because the response indicates that the instruction to form a mental image for each pair of words is the independent variable. The response earned point 2 because the response indicates that Group B is the control group. The response earned point 3 because it indicates that the research study is an experiment and "Doctor Jones wants to study the effect of a variable (mental imagery) … and conclude a cause-and-effect relationship." The response earned point 4 because the response indicates that Group B's results varied more than Group A's results. The response earned point 5 because it indicates that the students were required to participate, and because they were required to take part in the experiment, Dr. Jones did not get informed consent. The response earned point 6 because the response indicates that students might recall the first few pairs because of the primacy effect. The response earned point 7 because it indicates that the students who formed mental images used deep processing, while those who did not utilized shallow processing.

Sample: 2B
Score: 5

The response earned point 1 because the response indicates that the independent variable is whether or not the groups are asked to form mental images after seeing the word pairs. The response earned point 2 because it indicates that the control group is both Group B and the group not given the instructions to form a mental image. The response earned point 3 because the response indicates that an experiment is the correct research method and that a cause-and-effect relationship can be determined from the experiment. The response earned point 4 because it indicates a comparison between Group A and Group B and that Group A participants are more closely clustered around the average than Group B participants. The response earned point 5 because the response indicates that Dr. Jones did not allow participants to withdraw from the research if they wished and that the task is required "as part of their coursework." The response did not earn point 6 because it indicates priming, not the primacy effect. The response did not earn point 7 because the response does not indicate a difference between deep and shallow processing and how that would affect the remembering of word pairs.

Question 2 (continued)

Sample: 2C
Score: 1

The response earned point 1 because the response indicates that the mental imagery groups are the independent variable. The response did not earn point 2 because it does not distinguish the independent variable from the dependent variable, and the response fails to note that the design is experimental (it only lists one characteristic of experiments and it does not deal with cause and effect). The response did not earn point 3 because the response does not indicate that the research design is an experiment. The response did not earn point 4 because it does not indicate that the standard deviation refers to the spread of scores, and it also does not compare Group A and Group B. The response did not earn point 5 because it does not indicate an ethical flaw and instead only discusses differences in performance across participants. The response did not earn point 6 because the response does not attempt this point. The response did not earn point 7 because the response does not indicate a depth of process, only individual differences.