

BIG FOOT OR SHORTIE?

Activity type Idea

When introducing correlations and scattergrams, get students to do a correlation of shoe size and height of everyone in the class. It's quick, easy, gives a positive correlation, gives the students an opportunity to draw

a scattergram and to decide on the scales to use of the axes (as well as using personal data – but not too personal – which they enjoy).

Practical use

Class exercise to gather data then individual class exercise to draw a scattergram.

A CORRELATIONAL CROSSWORD STUDY

handout number **6.22**

Activity type Consolidation

No, not a crossword, just a correlational study about crosswords. It covers the basics of using a correlational design and other issues already covered such as operationalisation of variables.

It also makes students think about the essential differences between correlations and experiments by requiring them to design an experiment to see if there is a cause/effect relationship between verbal ability and ability to solve crossword clues.

Practical use

Individual: homework or assessment

Additional notes

If you have covered measures of central tendency, you can ask for the median scores on both tests.

Answers

1. Write an aim for this study. (1)

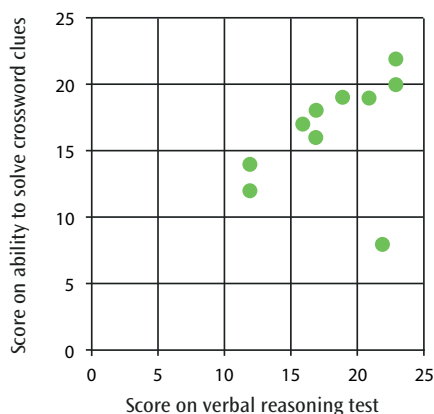
To investigate whether there is a positive relationship between ability to solve crossword puzzles and scores on verbal reasoning tests.

2. Write a suitable hypothesis for the study. (2)

There is a positive correlation between scores on a verbal reasoning test and ability to solve crossword puzzles. (The hypothesis should be directional.)

3. Draw a scattergram of the results, using a heading and clearly labeling the axes. (4)

Scattergram to show relationship between verbal reasoning and ability to solve crossword clues



4. What conclusions can be drawn from examining the scattergram? (2)

There is a fairly strong positive correlation (relationship) between scores on the verbal reasoning test and scores on the ability to solve crossword clues. People who are good at crosswords are also good at verbal reasoning (and/or people who are poor at verbal reasoning are also poor at solving crossword clues). One can therefore be used to predict another.

5. Suggest a way in which the researcher may have operationalised the variable of ability to solve crossword clues. (1)

Give the participants a crossword puzzle to solve and add up the number of clues successfully solved (ideally more than one puzzle of different types).

6. Briefly outline how a researcher could plan an experiment to see whether improved verbal reasoning increases people’s ability to solve crossword puzzles. What would be the IV and DV? (5)

Two groups of people of equal ability on verbal reasoning and crossword solving. Split in two randomly. Train one on verbal reasoning over a period of time and then test both on crossword solving ability. The IV is whether or not they have additional training in verbal reasoning. The DV is ability to solve crossword puzzles (operationalised in a suitable way).

7. What is the advantage of using the experimental method rather than doing a correlational study? Apply your answer to this study. (2)

The advantage of using an experimental design is that the results can show cause and effect. In this case they can show whether or not training to improve verbal reasoning can improve the ability to solve crossword clues.

8. What is the median of the scores on verbal reasoning? What is the mode and the mean of scores on ability to solve crossword clues? (3)

Median on VR = 18

Mode of scores on ability to solve crossword clues = 19

Mean of scores on ability to solve crossword clues = 16.5

CAN YOU BE TOO LAID BACK?

handout number **6.23**

Activity type Evaluation

This exercise covers several issues. The main purpose is to consider the advantages of using a scattergram to show a U- (or inverted U) shaped relationship. It also

revises directional/non-directional hypotheses and operationalising variables and requires the drawing of a scattergram.

Practical use

Individual: homework (or classwork)

Answers

- Should the hypothesis for this study be directional or non-directional? Justify your choice. (2)
Non-directional because the researchers do not agree on the direction.
- Write a suitable hypothesis for this study. (2)
There is a relationship between arousal (increase in heart rate) and performance on a motor task.
- How were the variables operationalised in the study? (2)
Arousal was operationalised by increase in heart rate (as measured by a heart monitor). Performance was operationalised by asking participants to carry out a motor task as quickly as possible.
- Describe the results shown in the scattergram. (4)
At low levels of arousal the performance increases, demonstrating a positive correlation to start with (2 marks) but at a certain level (in this case indicated by heart rate increase of just below 20 bpm) the performance goes down and there is a negative relationship between arousal and performance (2 marks).
- One way of measuring correlation is to use a number known as a correlation coefficient. In this study the correlational coefficient is +0.13, which is almost a zero correlation. Why may expressing this result in this way be misleading? (2)
Simply knowing that the correlation coefficient is weak implies that there is no relationship between the variables. This is misleading because the scattergram indicates that the relationship is positive at low levels of arousal and negative at high levels which gives much more accurate information. It is not a linear relationship.
- Suggest one limitation of correlational studies. (2)
Correlational studies do not show cause and effect. They do not demonstrate whether one variable causes the other to vary.
- Suggest one use of correlational data. (2)
Correlational data can enable researchers to make predictions since knowing of one variable can allow the other to be predicted.



CORRELATION OR EXPERIMENT?

Activity type Application

How many times do you find students stating clearly that a study is a correlation then discussing the IV and DV or writing a hypothesis (or a conclusion) that implies cause and effect?

It's vital that students recognise the difference between a correlation and an experiment when asked questions

in an exam. Obviously it affects the way in which the alternative (and null) hypothesis is written, the way in which the data is presented and analysed and the conclusions you can draw from the findings. This exercise attempts to clarify this distinction.

Practical use

Individual: homework or assessment

Additional notes

You may wish to give advice to students on ways in which to make the distinction between correlations and experiments. For example:

- Is any cause or effect mentioned or implied in the description of the study or the results?

- Is association/relationship or (even) correlation mentioned?
- Do any of the questions on the handout refer to a DV and IV?
- Is a difference being measured?

Answers

1. Correlation
2. An experiment
3. An experiment
4. Correlation
5. An experiment
6. An experiment
7. An experiment