

Section 5E: Homework Solutions

10. Does the following make sense: I found a nearly perfect negative correlation between variable C and variable D , and therefore was able to conclude that an increase in variable C causes a decrease in variable D .

Solution:

This does not make sense. Correlation alone never proves causality. The correlation could be a coincidence, or both variables could be responding to a common underlying cause.

□

16. A scatter diagram is given for television viewing habits vs. GPA for Children Ages 14-16

Solution:

- a) The variables are GPA and hours of television per week.
- b) The data has a strong negative correlation.
- c) Those who watch less television each week get better grades.

□

25. A data table is given.

Solution:

- a) You should be able to construct the scatter diagram.
- b) There appears to be a weak positive correlation.
- c) The correlation could be explained by asserting that in countries with higher speed limits, people tend to drive faster, and are more likely to have more frequent and more serious accidents.

□

28. A data table is given.

Solution:

- a) You should be able to construct the scatter diagram.
- b) There is a strong negative correlation.
- c) The negative correlation could be explained by asserting that in households with lower incomes, people apparently find that watching television is a popular and affordable form of entertainment.

□

In the following correlation statements, state the correlation type. Then state whether the correlation is most likely due to coincidence, a common underlying cause, or a direct cause. Explain.

35. When deer hunting permit costs were gradually increased in one region, the incidence of deer sightings increased.

Solution:

The cost of deer hunting permits is positively correlated with deer sightings. This is probably a case of direct cause: the more expensive the hunting permit, the fewer people take one out and hunt, so that more live deer will be sighted.

□

38. There is a strong correlation between tobacco smoking and incidence of lung cancer, and most physicians believe that tobacco smoking causes lung cancer. Yet, not everyone who smokes gets lung cancer. Briefly describe how smoking could cause cancer when not all smokers get cancer.

Solution:

The causes of cancer are often random. Cancer cells are produced when the growth control mechanism of normal cells are altered by a random mutation. Smoking may increase the chances of such a mutation occurring, but it will not occur in all individuals; by chance, some smokers escape cancer.

□

39. A famous study in Forum on Medicine concluded that mean lifetime of conductors of major orchestras was 73.4 years, about 5 years longer than that of all American males at the time. The author claimed that a life of music causes a longer life. Evaluate the claim of causality and propose other explanations for the longer life expectancy of conductors.

Solution:

People do not decide to become conductors until relatively later in life, say over 30 years of age. Having already survived this many years, a person's life expectancy is longer than average.

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