

Causality

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Class Discussion

Correlation doesn't mean causality. Examples, or wrong conclusions:

- Almost 100% of people who died had eaten tomatoes in their life. Therefore, tomatoes are deadly.
- After seat belts became mandatory, the number of people with injuries from car accidents arriving to a Hospital increased by 40%. Therefore, seat belts are dangerous.
- A company tested children from ages 7 to 10 and found that kids who weighed more, had better scores on all tests. Therefore, we shouldn't diet.
- Better education translates into longer life expectancy, study finds. Therefore, we should go to college to prolong our lives.
- People who pay with credit cards spend more on food than people who pay cash. Therefore, we should pay cash to lose weight.
- A study showed that people without children are more happy than people with children. Should we avoid children?

Warm-Up

Exercise 1. If you go north-east where will you end up? Will your path be infinite?

Exercise 2. Where on Earth you can see the sunrise twice in a day (24 hours)?

Exercise 3. Continue the sequence: F, S, T, F, F, ...

Causality

Exercise 4. A study showed that taller people are smarter. Does it mean that men are smarter than women?

Exercise 5. A study showed that people who spend less time on their homework get better grades. Should you stop doing your homework?

Exercise 6. People who retire late in life live longer. Should we aspire to working past retirement age?

Exercise 7. In 2010 the St. James school had 50% boys and St. Charles school had 80% boys. In 2011 the percentages stayed the same, but the total percentage of boys in both schools increased. How could it be?

Challenge Problems

Exercise 8. Three friends are deciding who has to go shopping. They have a coin they can flip. How can they use a coin, so they can decide who goes shopping with equal probability?

Exercise 9. The Smiths tell only the truth in the morning and always lie in the evening. The Johnsons tell only the truth in the evening and always lie in the morning. Today you met four people for coffee, two of them were from the Smith family, and two from the Johnson family. Here is what they said:

- A: B's last name is Smith.
- B: C is one of the Johnsons.
- C: A and D are have different last names.
- D: A and B have the same last name.

When was this coffee, and what is the last name of each of the four people?

Exercise 10. Adam flips a coin 10 times. Eve flips a coin 11 times. What is the probability that Eve has more heads?