Discussing Studies and Statistics

"There are three kinds of lies: lies, damned lies, and statistics" -Mark Twain

Warm up

- Do you know about any interesting statistics, studies, or facts (for example studies about health foods)?
- What role do statistics or figures play in your job? Do you ever use them to make decisions?
- Why do you think people are relying more and more on statistics as a way of understanding the world? Do you think there is a problem with this?
- Do you know of any commonly believed facts or statistics that are actually wrong or misleading?

1. Read through the study below and answer the questions on the next page.

The Marshmallow Test is a psychological experiment originally conducted by Walter Mischel at Stanford University in the late 1960s. In the experiment, a child is placed in a room with a single marshmallow (or sometimes another treat) on a table. The child is told that they can eat the marshmallow immediately if they want. However, if they wait for a specific period (usually around 15 minutes) without eating it, they will be rewarded with a second marshmallow. The researcher then leaves the room, and the child is left alone with the marshmallow. The test aimed to measure the child's ability to resist instant gratification in exchange for greater rewards in the future. Mischel and his fellow researchers then tracked the children for 2 decades and discovered that the children who were able wait for the second marshmallow achieved better academic performance, higher SAT scores, healthier body mass index (BMI), and overall better life outcomes in terms of social and cognitive functioning. However, some psychologists have pointed out that the ability to resist the marshmallow may be linked to other factors such as social and economic background, and claim that the test proves only correlation, not causation.

2. Answer the questions about the study from exercise 1.

a) What choice did the children in Mischel's study face? *Whether to eat a marshmallow immediately or wait and get 2 marshmallows.*

b) What was the study aiming to measure? *The child's ability to resist short term pleasure (and how that affected their performance later in life)*

c) What did Mischel find out about the children in later life in relation to the test? *That they generally did better in several fields including school, health, etc.*

d) What was the main criticism of Mischel's test? *That it does not prove that the children's ability to resist the first marshmallow really affects whether or not they do well later in life, it only proves there is a correlation between the two.*

e) What do you think of this study? Do you think it proves anything?

f) How do you think you would have done on this test as a child (aged 3-5)?

3. Complete the facts and statistics below with the phrases in the box.

approximately	researchers	compared	rate
probability	actually	according	revealed

a) The global literacy rate among adults in 2024 is 88% *compared* to 67% in 1967.

b) A 2017 study showed that the more churches there are in a city, the higher the crime *rate* in the city is.

c) *Approximately* 8% of Mongolians are descendants of Genghis Khan.

d) A 2023 study at the University of Michigan *revealed* that men cause 58% of the accidents on American roads.

e) If you gather a group of 23 random people, there is a 50% *probability* two of them will share a birthday.

f) In 2006 *researchers* placed gut bacteria from obese and healthy human twins into mice and found that the mice which received bacteria from obese twins gained more weight.

g) *According* to a study performed by the European Hydration Institute on 12 drivers, being dehydrated while driving is just as dangerous as being drunk while driving.

h) Many people are scared of sharks, but you *actually* have a much greater chance of being killed by a falling coconut than a shark.

? Three of the statistics/studies above are technically true, but misleading. Discuss which you think might be misleading and why with a partner.

4. Read through the explanations of the misleading statistics in exercise 3 and discuss with a partner.

Correlation vs Causation

Obviously churches do not cause crime. This is a classic case of correlation vs causation. The larger a city is, the more churches it will have. And, in general, the larger a city is, the higher the crime rate. The two are not necessarily linked. The common factor is the size of the city.

More than meets the eye?

In 2023 the university of Michigan conducted a study that found that although men caused 58% of the accidents on American roads, they also found that men spend more time driving (62% of drivers on the road are male), meaning that per hour of driving, women cause slightly more accidents than men. However, men were more likely to cause serious or fatal accidents.

Question the Source

There are a few elements that should make you sceptical of the study on hydration and driving. The first is that the sample size is far too small. 12 people is not nearly enough to draw any conclusions. On top of this, the study did not clearly define how dehydrated the subjects were. Finally, the name of the institute (European Hydration Institute) indicates the organization may be heavily biased. In fact, this institute is largely funded by Coca-Cola.

5. You are going to watch a video about misleading headlines based on studies which contains the vocabulary in the box. Use the vocabulary to complete the sentences.

flaw	placebo	hypothetical	contradict
assume	conclusions	random	evidence

a) There is a lot of *evidence* that smoking causes cancer.

b) We should not draw *conclusions* from just on study, we need more research.

c) Can I ask you a *hypothetical* question? What would you do if you had to move to another country?

d) He thought he was taking a pills for arthritis, but it was actually a *placebo*.

e) The study was published in a medical journal, so I think we can *assume* it's legitimate.

f) I can see your point of view, but I think there is one big *flaw* in your argument.

g) The participants for the study were chosen completely at *random*

h) It's pretty easy to find two studies about the same thing with results which *contradict* each other. You can usually find a study to back up any argument.

6. Watch the video and pause it after each headline is shown and try to figure out the flaw in the headline (by listening to the details of the study) with a partner.

Headline 1: Study shows new drug could cure cancer

Just because it works on mice does not mean it will work on humans. It needs a lot more research.

Headline 2: Aspirin may reduce risk of heart attacks

Only men were tested, therefore we do not know if it works with women as well.

Headline 3: Eating breakfast may help you lose weight

There was no control group (ie. a group who did not eat breakfast) therefore other factors could have influenced it. In particular the fact they were having their weight tracked may have led them to losing weight.

7. Optional task/homework: create one fake fact or statistic, and research two true facts or statistics. Tell them to your classmates and see if they can guess the fake statistic.