Topic: Types of studies

Question: In statistics, there are observational and experimental studies. Which of the following studies represents an observational study?

Answer choices:

A A hospital conducting a study measuring the effectiveness of a new drug places people into two groups. One group is the control group and is given a placebo. The other group is given the new drug and results are compared.

B A scientist conducting a study on a new mattress type and quality of sleep places people into two groups where one group sleeps on a standard spring mattress and the other group sleeps on the new mattress. The sleep cycles of each group are recorded and compared.

C A class conducts a survey that asks students to record their height and shoe size. The class creates a chart of the results and analyzes it for correlation.

D An educational researcher studying how praise affects student success groups students into three categories for the school year. One group is given no praise on their academics, the next group is only told that they are smart if they do well in the class, and the

final group is praised on how hard they have worked to achieve academic success.

Solution: C

An observational study analyzes information that's already there, while an experimental study manipulates what's happening to try to establish causality (people are put into at least two different groups and the results are compared).

A class comparing height and shoe size is not manipulating any information and just showing the correlation of height and shoe size, so it's an observational study.

The other three choices are types of experimental studies because people are placed into two or more groups so that one or more groups can be manipulated and the results can be analyzed.

Topic: Types of studies

Question: A study conducted in the Indian Ocean records the total number of plastic objects found in the ocean each year for 10 years. Classify the study as observational or experimental and the data collected in the study as data that forms a one-way or two-way table.

Answer choices:

A Observational and one-way

B Observational and two-way

C Experimental and one-way

D Experimental and two-way

Solution: A

The study on the total number of plastic objects found in the Indian Ocean is an observational study since we're observing the number of objects and not manipulating the data to find causality. The data is suitable for building a one-way table because we're only analyzing one variable, the number of plastic objects.

An observational and two-way study would be analyzing two variables, an experimental and one-way study can exist if you analyze one variable within the data, and an experimental and two-way study would be a study between two groups with one acting as a control group.

Topic: Types of studies

Question: Which of the following studies represents a matched pairs experiment?

Answer choices:

A A study recording the gender of Galapagos tortoises worldwide.

B A study analyzing the effects of one cup of coffee per day on blood pressure where people are placed into three groups. In the first group no one drinks coffee, in the second group people drink one cup of coffee per day, and in the third group they drink two or more cups of coffee per day. After two months blood pressure is recorded and compared to initial blood pressure.

C A study comparing the pollution emissions on five models of SUV vehicles.

D A study of the blood pressure medicine where the control group and experimental group only includes women of ages $40 - 65$ years old.

Solution: D

The study of the blood pressure medicine on women ages $40 - 65$ years old is an example of matched pairs experiment since the control group and treatment group consist of the same gender and age range. This controls the variables of gender and age.