Statistics for Beginners

Independent Samples **VS.** Dependent Samples

Two samples are **independent** if the sample values selected from one population are not related or somehow paired or matched with the sample values selected from the other population. Two samples are **dependent** (or consist of matched pairs) if the members of one sample can be used to determine the members of the other sample.

Tricks: The words like ***dependent, repeated, before and after, matched pairs, paired*** and so on are hints for dependent samples. In addition, if a row or a column in a chart of a question titled as subject such as "person" or "employee", it tells you that the samples are dependent.

- **Example 1:**

Is fishing better from a boat or from the shore? Pyramid Lake is in Nevada. Presidents, movie stars and people who just want to catch fish go to Pyramid Lake for really large trout. Let Row B represent hours fishing per fish from the shore, and let Row A represent hours fishing per fish using a boat. The following data are **paired** by month from April through October.

April	May	June	July	August	September	October

B: Shore	3.3	3.6	3.9	3.2	2.0	1.8	1.6
A: Boat	3.8	3.0	3.3	2.2	1.6	1.4	1.5

Interpretation: The word "paired" indicates the samples in this question are dependent/ matched pairs. The data of hours fishing per fish from the shore and the numbers of hours fishing per fish using a boat are paired / matched by month.

- **Example 2**

A researcher conducted an experiment to see if specific eye exercises can improve peripheral vision. A random sample of 5 people were rated for peripheral vision on a scale from 1 to 20 where 9 is considered average and higher scores indicate better peripheral vision. Then they followed the prescribed eye exercise program and were rated again. The results follow:

Subject	1	2	3	4	5
Before	9	8	7	10	6
After	10	9	11	12	9

Interpretation: The words "Subject, Before" and "After" in the chart show that the samples in this question are dependent/repeated which means the ***same*** *subjects (****one*** *group of samples)* did the eye exercises repeatedly (before and after).

- **Example 3**

A study is conducted comparing two competing medications for asthma. Sixteen subjects are involved in the investigation. The data shown reflect asthma symptom scores for patients randomly assigned to each treatment. Higher scores are indicative of worse asthma symptoms. Test the null hypothesis that there is no difference in asthma symptoms between medications. Use 5% level of significance.

Gender	Number of Patients	Mean Number of Sessions Attended	Standard Deviation
Male	20	14.6	6.3
Female	15	18.1	5.9

Is there a significant difference in the mean number of physical therapy sessions attended between male and female patients?

Interpretation: In the question, we don't see words like matched paired, repeated, dependent and so on. There are two independent samples: male and female which are not related or paired.

Reference

Elementary Statistics, Tenth Edition by Mario F. Triola