**How are dependent and independent samples different?**

Dependent samples are paired measurements for one set of items. Independent samples are measurements made on two different sets of items.

When you conduct a hypothesis test using two random samples, you must choose the type of test based on whether the samples are dependent or independent. Therefore, it's important to know whether your samples are dependent or independent:

* If the values in one sample affect the values in the other sample, then the samples are dependent.
* If the values in one sample reveal no information about those of the other sample, then the samples are independent.

Example of collecting dependent samples and independent samples

Consider a drug company that wants to test the effectiveness of a new drug in reducing blood pressure. They could collect data in two ways:

* Sample the blood pressures of the same people before and after they receive a dose. The two samples are dependent because they are taken from the same people. The people with the highest blood pressure in the first sample will likely have the highest blood pressure in the second sample.
* Give one group of people an active drug and give a different group of people an inactive placebo, then compare the blood pressures between the groups. These two samples would likely be independent because the measurements are from different people. Knowing something about the distribution of values in the first sample doesn't inform you about the distribution of values in the second.

The independent sample t-test was developed to examine differences between two independent groups. They are independent when samples are unrelated. The samples are independent if the study participants in one group are unrelated or different from the other group. Use of the t-test for independent samples require that the following assumptions are met.

1. Samples are normally distributed,

2. The dependent or outcome variable is measured at intervals/ratio levels.

3. The two samples have equal variance,

4. All observations within each sample are independent.

**Nonparametric Alternative:**

If the data do not meet the assumptions involving normality or equal variance, the nonparametric alternative is the **Mann-Whitney (U) test**  is used. This involves converting the data to ranks.

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