Introduction to Sample Size and Power

In the previous lessons, you learned about interval estimation and hypothesis testing.

You learned that if you're asking the question "What is the unknown value?", then you would compute an interval estimate of the value.

And if you're asking the question "Is the unknown value greater than X?", then you would conduct a hypothesis test.

In both interval estimation and hypothesis testing, the sample size plays a crucial role.

For interval estimation, we construct a margin of error around a point estimate.

Smaller margins of error, which lead to more precise estimates, are obtained by increasing the sample size.

For hypothesis testing, we calculate a test statistic, and use a p-value to measure the strength of the evidence against the null hypothesis.

The ability of your test to reject a false null hypothesis is known as statistical power, or simply power.

Increasing the sample size increases the power of your test.

In this lesson, you learn about the relationship between sample size and power for simple cases involving continuous data.

For a confidence interval for the mean, you learn how to calculate the sample size required to provide a specified margin of error.

For a one-sample t test, two-sample t test, and ANOVA, you learn how to calculate the sample size required to provide a specified power for your test.

Like the overriding topic of inferential statistics, sample size determination is a broad and deep topic that can get fairly complicated.

We discuss only the basic ideas and computations in this lesson, but we generally rely on the software to do the work for us.

As with any method, the computations used depend on your data, the context of your problem, and the analyses that you will run.

Determining the appropriate sample size is something that is done prior to collecting and analyzing data.

This requires that you think deeply about the types of data you will collect, what you hope to learn from your data, and how the data will be used.

The goal of data analysis is to make sound decisions from your data.

When you consider the sample size you need, prior to data collection, you ensure that you have enough information to make decisions. You are also more likely to use your limited resources wisely.

We strongly suggest that you consult with an expert for anything beyond the most basic sample size computations.

For more information about determining the sample size for interval estimation and hypothesis testing for continuous and categorical data, see the Read About It for this module.

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