Statistical Significance

Online course learning objectives

Social scientists often want to know if a finding is statistically significant, discuss the p-values or put confidence intervals around results. This course explains what these terms mean, how they are calculated, and how their origin lies in the way we use samples to measure and investigate people, organizations, and societies.

This course will help learners to:

- Understand the definition of and factors involved in establishing statistical significance
- Recognize the importance of inference and how we gain information about populations from samples
- Define, interpret, and calculate normal distribution
- Establish the validity of sample estimates through calculating and interpreting the standard error
- Use confidence intervals to identify a range of samples that will include the population parameter under investigation
- Define and calculate the p-value in order to interpret the statistical significance of your null hypothesis
- Recognize and evaluate what the p-value can tell us about our research

Language: English
Time to complete: 4 hours
Instructor: John MacInnes
Level: Intermediate

Online course full syllabus

MODULE ONE: WHAT IS STATISTICAL SIGNIFICANCE?

Understand what the term statistical significance means and recognize the difference between samples and populations. Know what makes a sample random and identify target populations relevant to different research questions.

Topics:

1. You can't measure everything
2. Samples are everywhere
3. What makes a sample representative of a target population?
4. Random samples
5. Research questions and target populations

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MODULE TWO: VARIABLES AND THEIR DISTRIBUTIONS

Understand what variables, values and cases are and distinguish continuous and categorical variables. Understand the mean and standard deviation as summary statistics and recognize a normal distribution.

Topics:

1. What are variables?
2. Summary statistics for variables
3. The normal distribution
4. The 95% rule
5. Calculation time

MODULE THREE: HOW DOES A RANDOM SAMPLE WORK?

Understand why random samples produce good estimates of population parameters.

Topics:

1. The law of large numbers
2. Repeated random events produce normal distributions
3. A random walk in a population
4. Random samples can measure anything
5. Size matters

MODULE FOUR: WHAT IS A STANDARD ERROR?

Establish the validity of sample estimates through calculating and interpreting standard errors.

Topics:

1. Defining a sampling distribution
2. Exploring sampling distributions
3. The standard error formula
4. Calculating standard error or proportions

MODULE FIVE: HOW DO I CALCULATE CONFIDENCE INTERVALS WITH STANDARD ERRORS?

Use confidence intervals to identify a range of samples that will include the population parameter under investigation.

Topics:

1. Get your head around point estimates
2. What does 95% confidence mean?
3. 95%, 99%, 99.9%, 99.9999%

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MODULE SIX: TESTING A NULL HYPOTHESIS

Define and calculate the p-value in order to interpret the statistical significance of a result.

Topics:

1. Hypotheses
2. Null hypothesis and p-values
3. P-values, null hypotheses and probability

MODULE SEVEN: WHAT DOES A SIGNIFICANT P-VALUE ACTUALLY MEAN?

Recognize what the p-value can tell us about our research and evaluate what the p-value can tell us.

Topics:

1. A statistically significant result is only the beginning
2. The four possible results of hypothesis testing
3. Effect size and sample size matter
4. A p-value does not measure hypothesis probability

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