Seeing is Believing

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Seeing is Believing

Concepts come to life when …

… you can “see” and interact with them.

Concepts become memorable when …

… you can associate an activity with them.

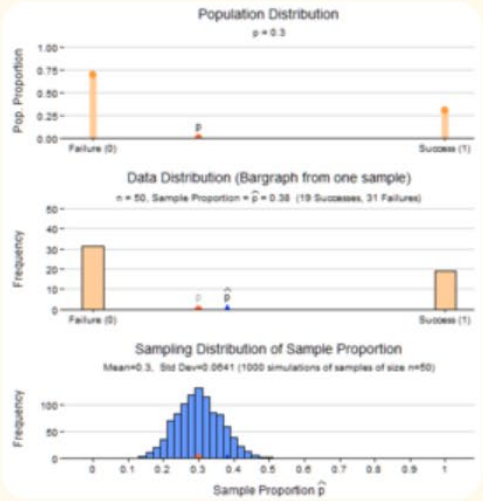
Concepts stay relevant when …

… you use them to analyze your own data.

www.ArtofStat.com/webapps

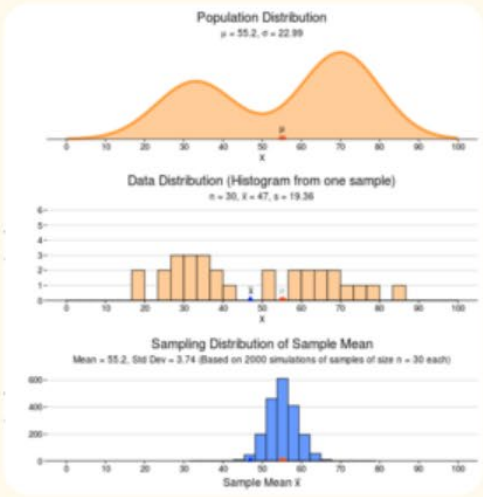
❑ Sample-to-Sample Variability

Sampling Distributions and the Central Limit Theorem



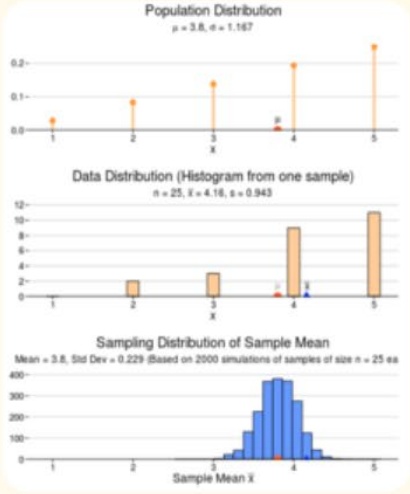
Sampling Distribution for the Sample Proportion

See how the sampling distribution builds up with repeated sampling and explore how its shape depends on n and p.



Sampling Distribution for the Sample Mean (Continuous Population)

For **continuous** variables. Choose from many different population distributions (or built your own) and explore the sampling distribution.



Sampling Distribution for the Sample Mean (Discrete Population)

For **discrete** variables. Define your own discrete distribution (such as uniform or skewed) and explore the sampling distribution.

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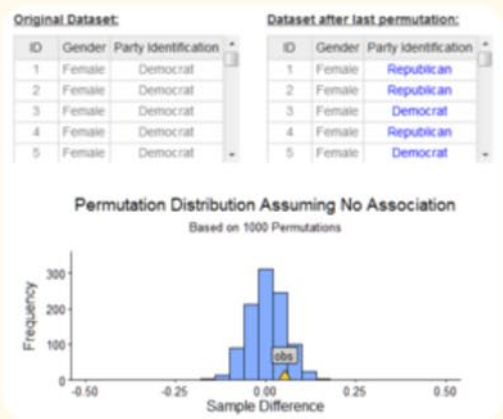
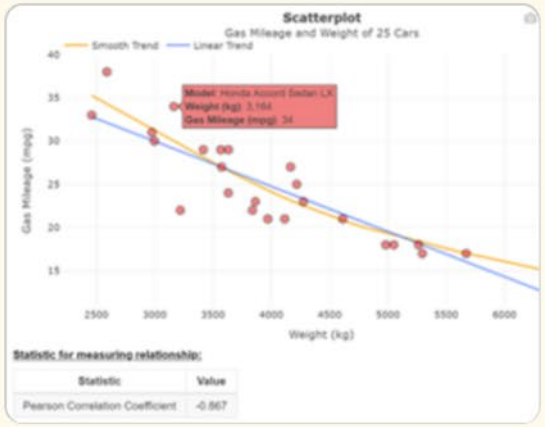
- Ratio of Proportion (Relative Risk)

Association, Linear Regression and Logistic Regression



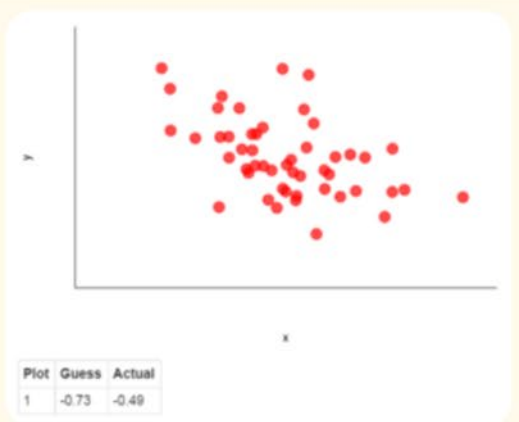
Association Between Two Categorical Variables

Construct 2x2 contingency tables, obtain conditional proportions and get a bar graph. Find the **difference** or **ratio** of proportions. Built the sampling distribution via resampling.



Scatterplots & Correlation NEW !

Construct interactive scatterplots, hover over points, move them around or overlay a smooth trend line. Find the correlation coefficient *r*. Built the sampling distribution of *r* via bootstrapping or permutation, one resample at a time.



Guess the Correlation

Randomly generate scatterplots to guess the correlation coefficient *r*. Optionally, display the regression line. How do your guesses correlate with the actual values?

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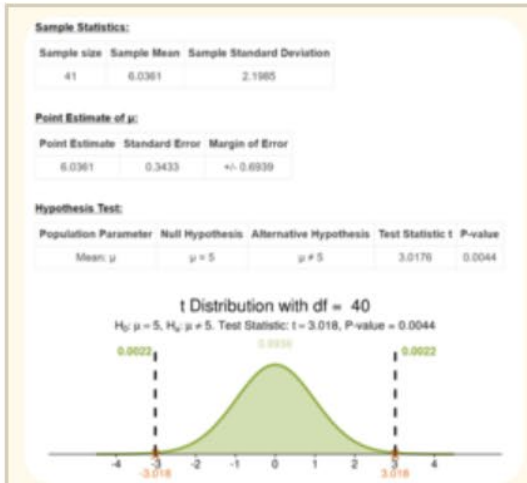
- Inference for a Proportion

One Sample Inference: Confidence Intervals & Significance Tests

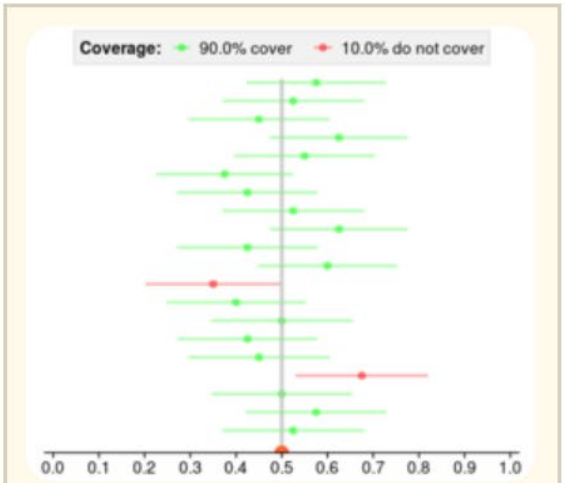
Inference for a Proportion Updated

Find confidence intervals and test hypotheses about a population proportion. Visualize the interval or P-value.



Inference for a Mean Updated

Find confidence intervals and test hypotheses about a population mean. Visualize the interval or P-value.



Explore Coverage

What does 95% confidence mean? What affects the width of an interval? Visualize with intervals for proportions or means.

Inference for a Proportion

8.14 COVID-19 infections When the COVID-19 pandemic broke out in March 2020, one of the important parameters for planning how to respond to the crisis was the proportion of a country's population that was infected with the virus. Because testing for the virus was only available for those who presented with severe symptoms (tests were in short supply), the proportion of those that tested positive for the virus was not a reliable estimator for the general population because many people that contracted the virus never showed any symptoms. In an effort to estimate this proportion, the country of Iceland was one of the first to obtain what could be treated as a representative sample. Between March 13 and March 21, 2020, a genetic lab in Iceland tested 5,571 people, of which only 48 tested positive.

TRY

APP

a. Estimate the population proportion of infected people in Iceland around the time the testing took place.

b. Find the margin of error for a 95% confidence interval for this estimate.

c. Find a 95% confidence interval for that proportion and interpret.

Seeing is Believing

Thank you for your attention!

- Please ask questions and give feedback in the Q&A session.

- Resources:
  - http://www.artofstat.com/webapps.html
  - Article on Eyewitness Testimony: "The Novel New Jersey Eyewitness Instruction Induces Skepticism but Not Sensitivity" by Papailiou, Yokum and Robertson, 2015; search for it on PLOS One.