

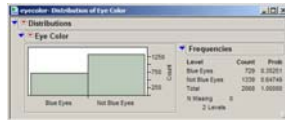
Using the JMP Scripting Language to Teach Sampling and Inference for the Proportion*

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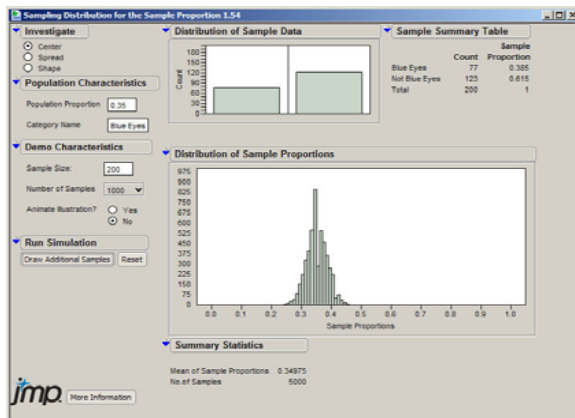
Sampling Distribution

Problem: In a survey of introductory statistics students, 729 out of 2068 (35.25%) students stated they had blue eyes.

If 35% of all introductory statistics students have blue eyes, how will the proportion of students with blue eyes vary from sample to sample in samples of size 200?



Questions: What is the population and its proportion? What is the sample? How will the sample proportion change from sample to sample? How is this change related to the sample size and population proportion?

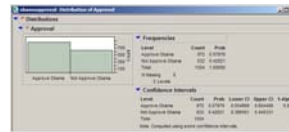


Investigations:

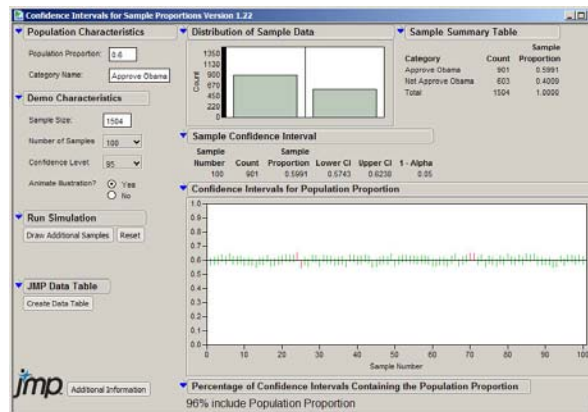
- Sampling Variability
- Distribution of Sample Proportions
 - Center – Mean of Sample Proportions
 - Spread – Std. Dev. of Sample Proportions
 - Shape – Normal Quantile Plot of Sample Proportions
- Effect of Assumptions on Distribution of Sample Proportions

Confidence Interval

Problem: In a Gallop Poll taken June 16 – 18, 2009, 58% of 1504 adults (aged 18 or older) surveyed nationwide stated they approved of the job performance of President Obama. What is the 95% confidence interval for the proportion of all adults nationwide that approved of the job performance of President Obama?



Questions: What does the word “confidence” mean? What effect does the percentage of confidence have on the confidence interval?



Investigations:

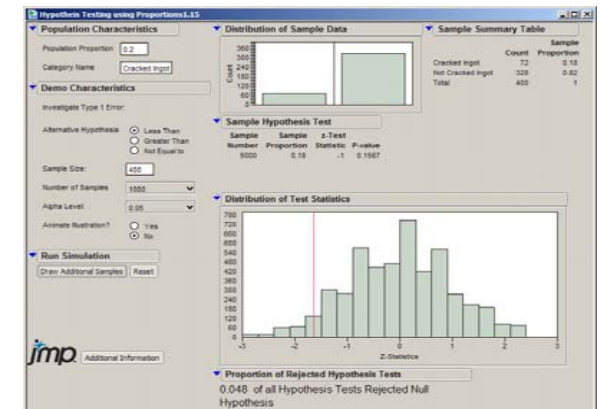
- Sampling Variability
- Variability of Confidence Interval
- Effect of Confidence Level on Confidence Interval
- Coverage Rate vs. Confidence Level of Confidence Intervals
- Effect of Assumptions on Coverage Rate of Confidence Intervals

Hypothesis Test

Problem: The cracking rate of ingots used in manufacturing airplanes is 20%. A new process is designed to lower the proportion of cracked ingots. In a sample of 400 ingots, 18% of them cracked. Did the new process actually lower the proportion of cracked ingots?



Questions: What is a p-value? What effect does the alpha level have on the percentage of rejected null hypotheses?



Investigations:

- Sampling Variability
- Variability and Distribution of Test Statistic
- Variability of P-values
- Meanings of P-value and Type I Error Rate
- Effect of Assumptions on Percentage of Rejected Null Hypotheses

*All JMP scripts in this poster were designed by Amy G. Froelich, Iowa State University and William M. Duckworth, Creighton University and programmed by Predictum, Inc. This project is funded by JMP Statistical Discovery Software. All JMP Concept Discovery modules can be downloaded free of charge from http://www.jmp.com/academic/learning_modules.shtml