

JMP INTRO® Lab Activities

Lab Activity – Confidence Interval for a Proportion

Data Set: Students

A confidence interval for a proportion is an interval that is computed from sample data, providing a range of plausible values for the value of the population proportion.

You should have already used the formula for a confidence interval for a proportion:

$$\text{C.I. for a proportion: } p \pm (z \text{ critical value}) \sqrt{\frac{p(1-p)}{n}}$$

In this activity, you will learn how to use JMP INTRO to find a confidence interval for a proportion.

Start your computer, open JMP INTRO and open the data file named **Students**. This data set contains the gender (sex), heights and weights for a sample of 233 students. This is a large sample and the required conditions for the large-sample confidence interval technique are met.

Use **Analyze**® **Distribution** with sex as the **Y,Column** to create a Histogram. JMP INTRO also calculates the frequencies and probabilities. Add a Probability axis to your histogram using the red triangle menu next to sex, **Histogram Options**® **Prob Axis**. Click the red triangle next to sex and select **Confidence Interval**® **.95**. A new Confidence Interval table will appear in the display giving the probabilities, Lower CI, Upper CI and 1-Alpha for both males and females.

Open your word processing program and copy and paste the histogram (with a probability axis), Frequencies table and Confidence Intervals display into your report. Make sure you put a title on your graph. Interpret the confidence interval in the context of the data.

Use the confidence interval formula given above to calculate the 95% confidence interval for the proportion of males in the population from which this sample was drawn. Show this in your report. Compare your results to the results from JMP INTRO.

Click the red triangle next to sex and select **Confidence**® **Interval**® **.90**. Copy this new confidence interval table into your report. Click the red triangle next to sex and select **Confidence**® **Interval**® **.99**. Again, copy this into your report. Describe how changing the confidence level affects the width of the confidence interval.

Print a copy of your lab report. Proofread your copy, make corrections as needed, close JMP INTRO and the word processing program, and log off.

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Teacher Notes

Lab Activity – Confidence Interval for a Proportion

Objectives:

- Use JMP INTRO to display categorical data with a histogram.
- Use JMP INTRO to calculate confidence intervals for a proportion using different confidence levels.

Time Required: Approximately 20 to 30 minutes

Materials:

- Confidence Interval for a Proportion student activity directions
- Students data set (this is a JMP IN data set)

Prerequisites:

- Students should have experience producing confidence intervals for a proportion by hand and/or with graphing calculators.
- Students should have basic knowledge of how to use a word processing program.

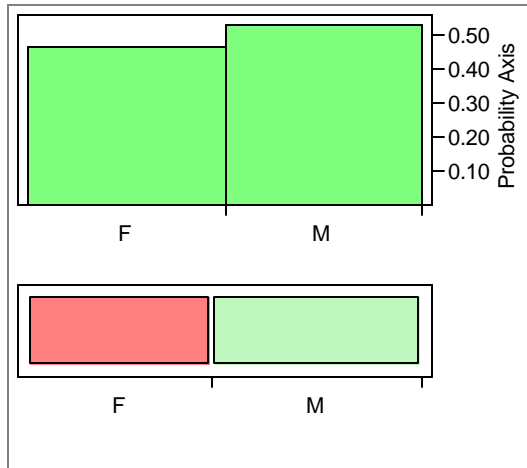
JMPINTRO Notes:

- If you have not already downloaded the JMP IN data sets, you may wish to do so before this Lab Activity or you may substitute a data set from DASL or another web site.
- JMP IN data sets can be downloaded from SAS (the parent company of JMP) free of charge. To do so, go to the www.jmpdiscovery.com website. Go to **Support & Services** on the left-hand side, and click on **Documentation**. At the top of the next screen, click on **JMP IN Doc**. You may need to scroll down on this screen until you reach a link labeled **sample data used in the examples**. Click here. You again may need to scroll down a bit, until you reach the download area. Choose the correct format, and click on the **Request Download** box. When you do so, you will be asked to complete a profile form before downloading.

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Answer Key

Here are suggested answers for Lab Activity-Confidence Interval for a Proportion:



Frequencies

Level	Count	Prob
F	109	0.46781
M	124	0.53219
Total	233	1.00000

2 Levels

Confidence Intervals

Level	Count	Prob	Lower CI	Upper CI	1-Alpha
F	109	0.46781	0.404785	0.531881	0.950
M	124	0.53219	0.468119	0.595215	
Total	233				

Note: computed using score confidence intervals

Based on what we have seen in this sample, we can be 95% confident the true proportion of males in the student population, from which this sample is drawn, is between 0.468 and 0.595.

$$\begin{aligned}
 95\% \text{ C.I.} &= .53219 \pm 1.96 \sqrt{\frac{(.53219)(1 - .53219)}{233}} \\
 &= .53219 \pm 1.96(.03269) \\
 &= .53219 \pm .06407
 \end{aligned}$$

95% C.I. (.46812, .59626)

This is the same interval that JMP INTRO calculated.

Confidence Intervals

Level	Count	Prob	Lower CI	Upper CI	1-Alpha
F	109	0.46781	0.414722	0.52164	0.900
M	124	0.53219	0.47836	0.585278	
Total	233				

Note: computed using score confidence intervals

Confidence Intervals

Level	Count	Prob	Lower CI	Upper CI	1-Alpha
F	109	0.46781	0.385672	0.551732	0.990
M	124	0.53219	0.448268	0.614328	
Total	233				

Note: computed using score confidence intervals