JMP® Introductory Lab Activities

Activity 13: Hypothesis Testing, Two-Sample *t*-Test

Data Sets: HTWT12.jmp and HTWT15.jmp

Summary

It is well known that mean height for adult males is greater than for females. You are going to examine if the mean heights for 12-year-old and 15-year-old adolescent males are greater than the mean heights for similarly aged females.

You will conduct two-sample t-tests, and summarize your test results and conclusions in a report (required output and discussion is in italics).

Note: In order to conduct a two-sample t-test, the data must be stacked in one column and the labels must be stored in a separate column.

Exploring the HTWT12 Data

Open the file **HTWT12.jmp** from the JMP **Sample Data** directory. This file contains the gender, heights and weights for 63 12-year-old students.

Choose **Analyze > Distribution** using **Height** as the **Y, Columns** variable and **Gender** as the **By** variable. Select **Uniform Scaling** and **Stack** from the **top red triangle** to compare distributions.

Look at the displays of the data to see if the conditions for using the two-sample *t*-test are reasonable.

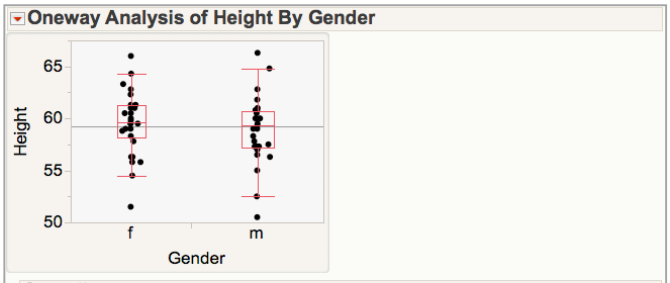
HTWT12 Data: Conducting a Two Sample t-Test

To formally compare the two distributions, use **Analyze > Fit Y by X**. Select **Height** as the **Y, Response** variable and **Gender** as the **X, Factor**. Because **Gender** is categorical, this produces side-by-side vertical dot plots for the two gender groups.

To better see the individual points, click on the red triangle and select **Display Options > Points Jittered**.

Select **Quantiles** from the red triangles to produce box plots and a table of Quantiles.

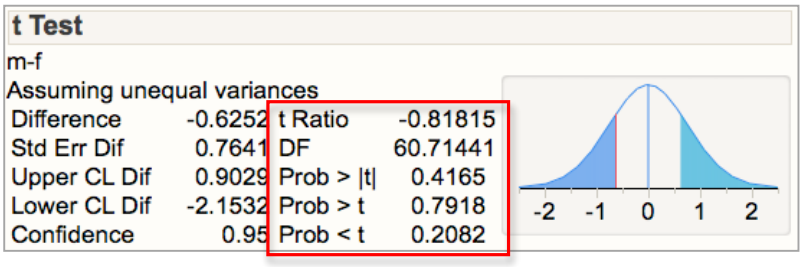
Does there appear to be a difference between the two distributions?



Quantiles

Level	Minimum	10%	25%	Median	75%	90%	Maximum
f	51.5	55.8	58.175	59.65	61.3	63.25	66
m	50.5	55.52	57.15	59.3	60.65	62.4	66.3

To continue with the analysis, select **t Test** from the red triangle. This produces a two-sample t-test without assuming that the variances are equal.



The test statistic and p-values for the two- and one-sided tests are provided in the middle of the display. For a one-sided test, the correct p-value has the same sign as the alternative hypothesis.

Activity: Conduct a Two-Sample t-Test Using the HTWT15 Data

Repeat this analysis, using the second data set **HTWT15.jmp**, a sample of 15-year-old males and females from a high school. Test the hypothesis that the mean height for males this age is greater than the mean height for females of the same age.

Using your results from JMP, write a complete hypothesis test, using one of the commonly used alpha levels.

Include:

- *Assumptions.*
- *Hypotheses.*
- *Sample statistic values.*
- *The test statistic.*
- *The p-value.*
- *Conclusions in the context of the problem.*

Be sure to include a graphical display of the data and hypothesis test results, with the correct p-value circled.

Explain how you chose the proper p-value for this test.

In your solution, remember to answer the original question posed.