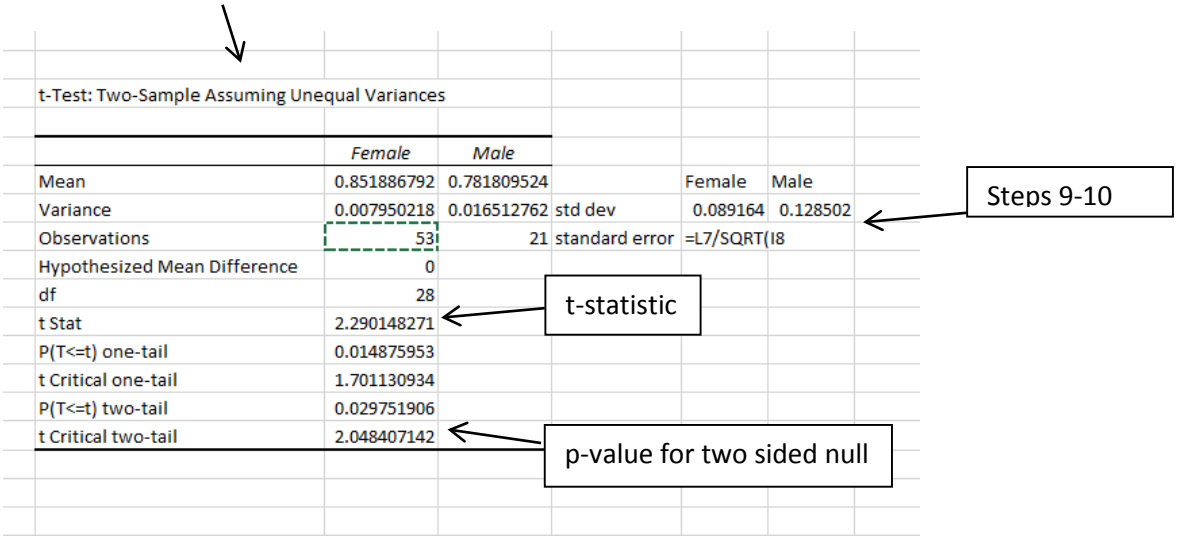
Bar Charts for Means and Independent t-tests in Excel 2016

You can use the Data Analysis Toolpak to conduct an Independent t-test to see if the means for happy are the same for males and females.

Independent t-test

1. You should already have the Excel tutorial data file open and the Gender and Happy variables copied into a new sheet. Sort the data by Gender.
2. You should create two columns of the outcome variable, one column for the first group and a second column of the second group's data. For our data we will create a column for the males' happiness and one for the females' happiness.
3. Select the Data tab and choose Data Analysis in the top right hand corner
4. Choose 't-test: Two-Sample Assuming Unequal Variances' in the Data Analysis menu
5. In the 'Variable 1 Range' box enter the data in the 'male' data column including the variable name
6. In the 'Variable 2 Range' box enter the data in the 'female' data column including the variable name
7. Check the Labels box (leave this unchecked if you did not include the labels "male" and "female" with your data)
8. In the output range, enter the cells where Excel will place the output (for example, G7:J20) and click OK

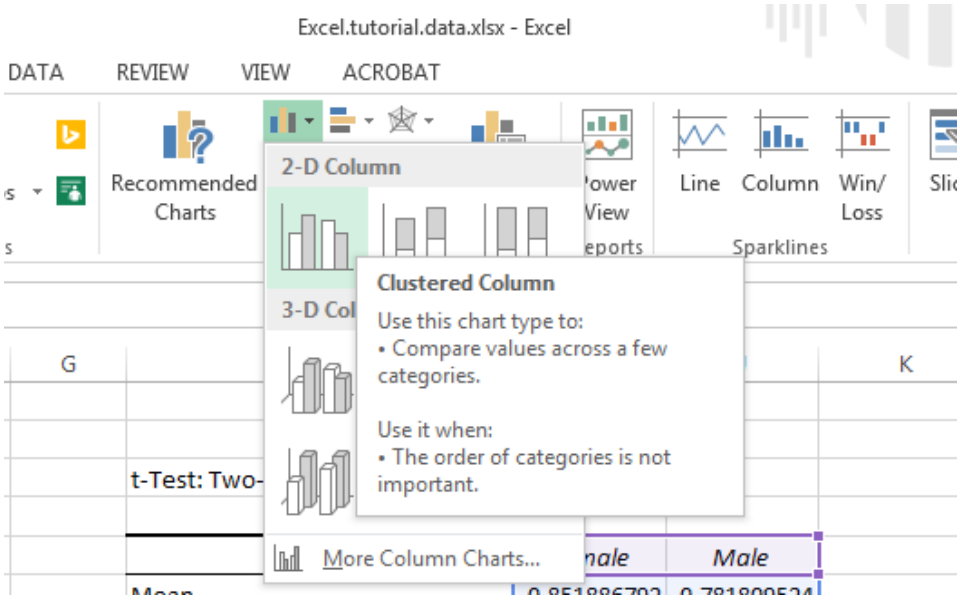
The output from steps 1-8.



Creating a Bar Chart of the Means

To create a bar chart of the means, first you need to calculate the standard error for each group. Excel does not calculate the standard error for the groups.

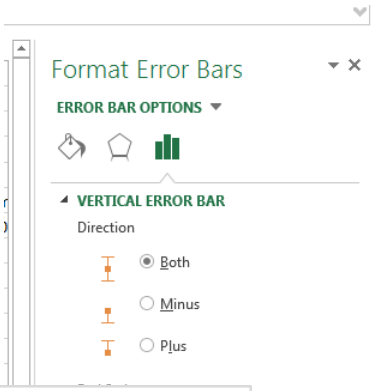
9. Add a table to calculate the standard error. In the first cell enter 'Standard deviation' and in the row below type 'Standard Error.' Label columns for 'male' and 'female' for each of these.
10. In cell next to the label, enter the following equation to calculate the standard deviation for each group referencing the cell data that was calculated in the previous steps. Do this for both males and females separately.
    - Standard deviation: **=SQRT[variance]**
    - Standard error: **=[standard deviation]/SQRT([observations])**
11. Select the cells with the male and female labels and the means for those values from the table generated in step 8.
12. Choose the Insert Tab
13. Select Column, and choose the first 2-D column graph option "Clustered Column"



Excel creates a bar chart, but there are still some formatting changes to add, and we also need to add standard error bars to the graph.

Graph Formatting Instructions:

14. Click on the chart to bring up the Chart Tools menu and click on 'Add Chart Element' and select the Error Bars option and choose 'More Error Bars Options' from the list
15. From the menu that appears on the right of the screen select the 'Both' option for direction and the 'Cap' option for end style
16. Under the Error Amount box, select the Custom option and click the 'Specify Value' button
17. In the Positive Error Value box, select BOTH male and female standard error cells that you calculated in Step 10
18. In the Negative Error Value box, select BOTH male and female standard error cells that you calculated in Step 10
19. Click OK, then close the error bars interface window
20. Under the Add Chart Element menu, go to Axis Titles and add both a 'Primary Vertical' and 'Primary Horizontal' axis title
21. Rename the vertical axis title 'Happiness Level' and rename the horizontal axis label 'Gender'
22. Select to add a Chart title and choose 'Above chart'
23. Rename the chart title "Gender Differences in Happiness"



The graph should appear as follows once you have completed steps 9-24: