A Picture is Worth...

Using an Underline Older Program to Make Charts and Graphs with Data from the American Community Survey

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As the saying goes, a picture is worth a thousand words.

Showing margins of error in a chart or graph can make them easier to understand.

And, since margins of error are an indication of the data's reliability,

it is important to always include them – even in charts and graphs.

This publication provides assistance with how to include margins of error in charts and graphs.

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Why do estimates from the American Community Survey include margins of error?

For some time now the U.S. Census Bureau has been replacing the Decennial Census Long Form with the American Community Survey (ACS) as the way to collect detailed data on social, economic, and housing characteristics.

One of the important changes that came with the American Community Survey is that judging the reliability of the data is now up to us.

To help us do this, the Census Bureau provides the margin of error for each estimate and each percent.

> If this is your first time using data from the ACS, see *New Kid in Town: Understanding Data from the American Community Survey*. You can find it on the Kentucky: By The Numbers website at:
> **http://www.ca.uky.edu/snarl/**

Why do I need to include the margins of error?

Without the margin of error, there is no way to assess the reliability of the data.

When the margin of error is smaller, the estimate is more precise. **When the margin of error is *larger*, the estimate can be thought of as being more '*fuzzy*' or '*blurry*.'**

What is a "margin of error?"

The margin of error (sometimes abbreviated as MOE) tells us the range within which the estimate most likely falls.

If you have seen poll results reported in the news, when they say "plus or minus 5 points," they are telling you the margin of error.

> To learn more about margins of error, see *And Now for the Grain of Salt: Margins of Error and the American Community Survey*. You can find it on the Kentucky: By the Numbers website at:
> **http://www.ca.uky.edu/snarl/**

With the margin of error, we can determine the range within which the estimate most likely falls.

Since the estimate is generally the midpoint, finding the range represented by the margin of error is as straightforward as it seems.

To find the top of the range, **add** the margin of error to your number. To find the bottom of the range, **subtract** the margin of error from you number.

For example, according to the 2012 American Community Survey's 5-year estimates, there are 968 (+/- 182) people over the age of 25 in Bell County who have a bachelor's degree. In this case, the range represented by the margin of error is a high of 1,150 and a low of 786 people.

The same principle applies to charts and graphs.

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We need to tell the computer program how much to add and how much to subtract so it can display the range represented by each margin of error.

1st step:
Set up your data

The first step in creating a chart or a graph is to set up your data. You will need to create a worksheet that has two columns: one for the estimates and one for the margins of error.

When using the percent data, be sure that both columns are formatted in the same way. If you reformat the data as a percent (with a % sign), then the margins of error should be as well.


2nd step:
Make a chart

Using the data (not the margin of error), make a chart like you usually would.

(*To make it easier to see, I made the chart below with the following options: data labels - value; gridlines - none; legend - none; and I used a darker color for the bars.*)
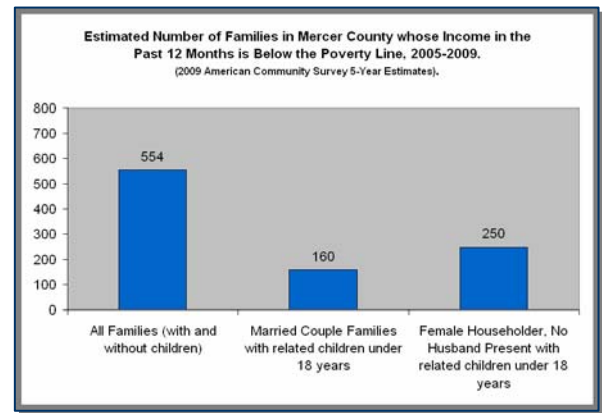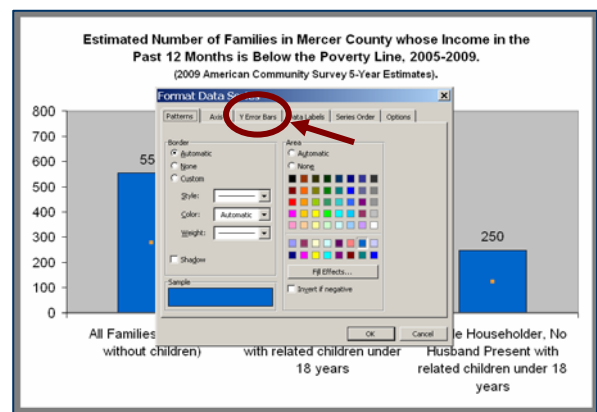

3rd step:
Include the margins of error

Now we need to tell the program to include the range represented by the margins of error. To do this, **right click** on one of the bars in the chart. A small box will appear.
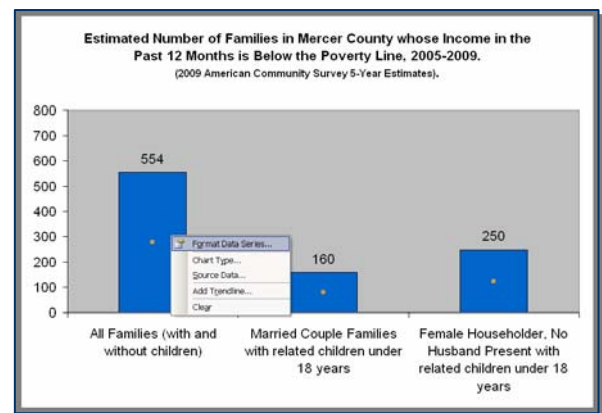

In the small box, **select "Format Data Series..."** and a large box will appear. Here, click on the tab "**Y Error Bars.**"


Under this tab, we are going to tell the program where to find the margins of error data.

Remember, the margin of error gives us the number to add and the number to subtract in order to get the range.

First, we'll tell the program where to find the number to add. In the box, **click on "Custom."** **Your cursor should be blinking in the top box next to the "+" sign.**
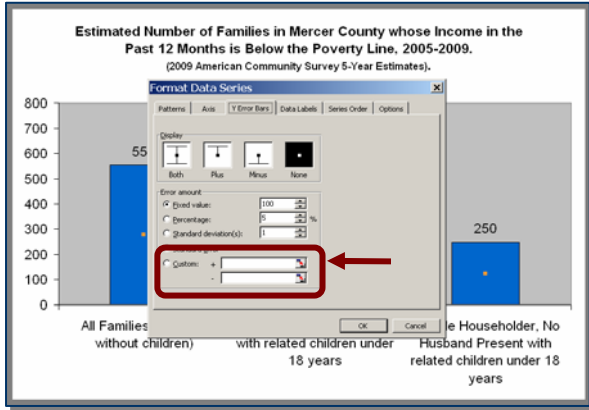
Now, go **back to the worksheet with your data** and highlight the cells that have the margins of error. (Don't worry, the computer will follow you.)
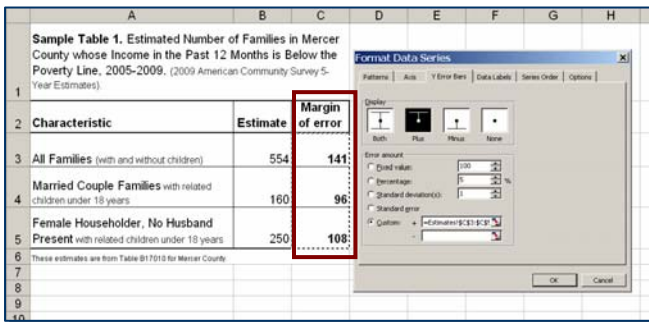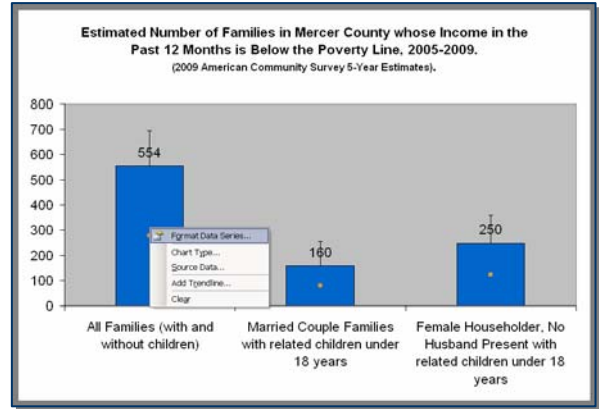

Once the cells are highlighted, **click "OK."** The program will return to your chart. You should be able to see that each bar on your chart now has a line. This line is called **an error bar**. This part of the error bar indicates the high end of the range represented by the margin of error for each estimate.
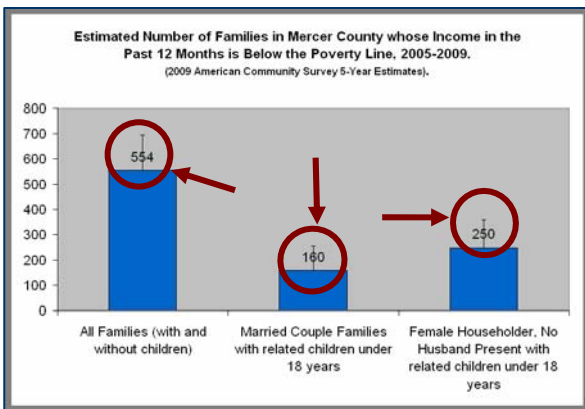

Next up, we need to tell the program where to find the number to subtract. To do this, the procedure is pretty much the same.

Just like before, **right click** on one of the bars in the chart. Remember this box? Pick "**Format Data Series…**"
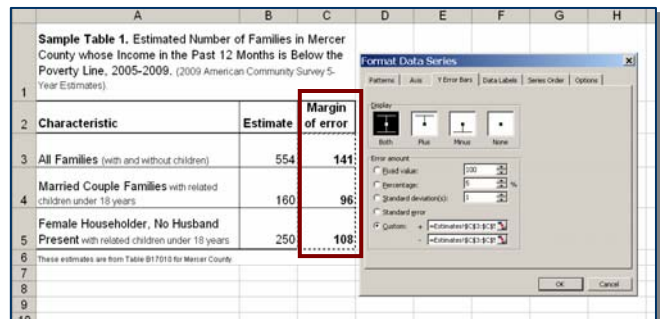

When the new box appears, it should bring you back automatically to the "Y Error Bars" tab. If it doesn't, **click on the tab "Y Error Bars."**
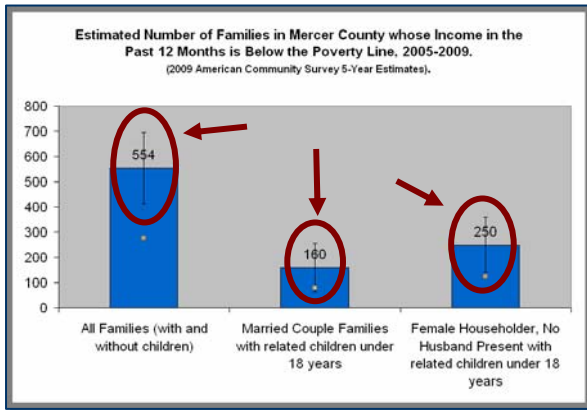
This time, **put your cursor in the box next to the "-" sign.**
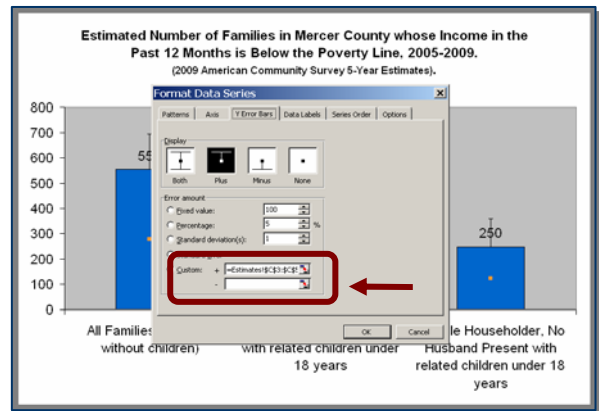
Now, go **back to your worksheet with your data again** and highlight the **same cells** with the margins of error that you did last time.

Click "OK." The program will again return you to your chart. You should be able to see that each bar on your chart now has a longer line or error bar.

Estimated Number of Families in Mercer County whose Income in the Past 12 Months is Below the Poverty Line, 2005-2009.
(2009 American Community Survey 5-Year Estimates).

The error bar shows both the high and low end of the range represented by each margin of error. If you want to make the error bar thicker or change the color, right click on it to change the formatting.

Don't worry about the error bar going through the data labels on your chart. Just like you normally would, you can always move them.

If you are making a line graph, the same principles apply. Instead of right clicking on a bar, right click on a data point. Other than that, the procedure is the same.

Some of the margins of error in my chart seem awfully big. How big is too big?

Remember, there aren't any hard and fast rules when it comes to deciding if a margin of error is too big.

If precision is not important, even an estimate with a large margin of error could still be a useable estimate.

The Census Bureau recommends using your own judgment when assessing margins of error.

And, it's okay if you decide that the margin of error is too large for the estimate to be useful.

Is the ACS the only place I will see margins of error?

Two other places you will see them is in the Small Area Income and Poverty Estimates and the Small Area Health Insurance Estimates. Here is what a line graph of county poverty estimates look like:

Estimated Poverty Rates for Mercer County, Kentucky, 2005-2009.
(Small Area Income and Poverty Estimates).
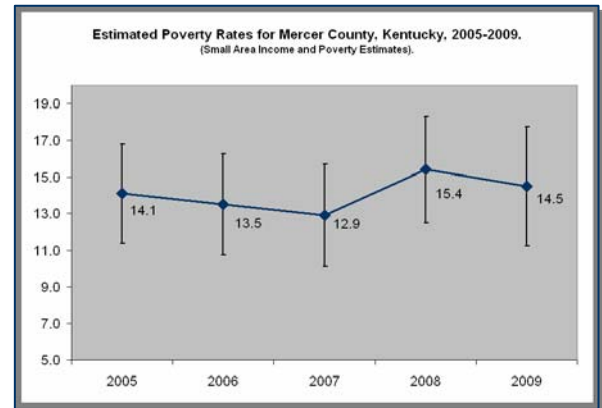
How do I find more information?

There is a special section of the Kentucky: By The Numbers website that has been devoted to building resources and linkages to help out in understanding and using data from the American Community Survey.

http://www.ca.uky.edu/snarl/

The Census Bureau's website on the American Community Survey also has lots of resources including training presentations and a publication called *How to Use the Data*.

Just click on the tab called "**Guidance for Data Users**" to see what's available.

http://www.census.gov/acs/www/