If you decide to use a figure in your paper, you should create it using Excel or another similar program. Creating a figure in Excel is very easy. For instance, let’s imagine that I wanted to graph the data from the example we used in class. Recall that the three conditions were (1) criminal record, (2) clean record, and (3) no information, and that the DV was a rating from 1 (completely sure of defendant’s innocence) to 10 (completely sure of defendant’s guilt).

In Excel, I would type the mean of each group into a spreadsheet, as shown below:

<table>
<thead>
<tr>
<th></th>
<th>A</th>
<th>B</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>criminal record</td>
<td>8</td>
</tr>
<tr>
<td>2</td>
<td>clean record</td>
<td>4</td>
</tr>
<tr>
<td>3</td>
<td>no information</td>
<td>5</td>
</tr>
<tr>
<td>4</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note that I have included the heading for each level of the IV. If I had more than three levels of the IV, I could continue adding rows. I could also have presented the information in three columns rather than in three rows; it doesn’t matter. You can always change it once you’ve created the graph by highlighting the graph, going to the “Chart” menu, choosing “Source Data,” and then clicking on “Switch Row/Column.”

Next, highlight all six cells and go up to the “Insert” menu. Choose “Chart.” You’ll see a variety of chart types, as shown below.

Choose “Column”. You will then see a variety of column chart types, as shown below. Click on the 2-D Clustered Column.

Your bar graph will then appear as part of your spreadsheet, as shown in the left-hand figure below. Note that the legend (“Series 1”) is unnecessary here. Click on it to highlight, and then hit “delete” to remove it (see right-hand figure).

Next, select the Chart Layout option on the main toolbar to open the layout options. Under the “Labels” option, select “Axis titles” and the “Horizontal Axis Title” option and select “Title below Axis”. This will create a text box below your graph where you can type in your title. I typed in “Experimental Condition”. Do the same for the “Vertical Axis Title”, selecting the “Rotated Title” and typing in your y-axis label. Your y-axis label should explain the units of measurement used (e.g., I labeled the y-axis “Mean rating of defendant’s guilt”). It is very important to label your axes.
You can play around with the formatting of the figure. For papers, your bars should be simple and clean looking (as per APA Style): black and white or shades of grey. To change bar colors, simply double click on a bar. You will then see the dialog box below on the left. Choose the desired “fill” color from the drop-down menu. You can also adjust the scale of your y-axis by either double-clicking on it or by choosing the “Axes” option on the toolbar and selecting “Axis Option” for the appropriate axis. For this example, the rating scale ranged from 1-10, so a y-axis value of 0 is not appropriate. To change the scale, follow the above process and change the minimum to 1. In other cases, you might want the minimum to be zero.

Other chart features can be changed by exploring the “Chart Layout” toolbar. If you have a legend (as you would when you have more than one IV), you can choose its position (e.g., top, bottom, left, right) here. You can double-click on one of the bars to change the color of the bars. You can also select the “Gridlines” option on the “Chart Layout” toolbar to remove gridlines.

You can also play around with the font sizes. If you click in the upper left-hand corner of the chart, you can select the entire chart, and then “Format Selection” and go to font to change the font and sizes of all text that appears in the chart. As a rule, you should use a sans serif font (such as Helvetica or Arial) for figures. The figure I created appears below. I would then paste it from Excel into my Word document so that it appeared on a page that had a running head and page number. I would then type a figure caption beneath it as I’ve done below.

Figure 1. Mean rating of defendant’s guilt as a function of information provided about defendant’s criminal record.
Creating Figures When There is More Than One IV

Imagine that I conducted an experiment very similar to the first, only now I was interested in whether an additional factor—gender of the defendant—also played a role in guilt ratings. My design would now be a 3 (prior information: criminal record, clean record, no information) x 2 (gender of defendant: male or female) factorial design. We will talk more about factorial designs later in the course. I have two independent variables, one with three levels and one with two levels.

Imagine that my new means are as follows:

![Table showing means for different conditions](image)

Notice that I’ve typed headings in the second and third columns. I could also have put male and female down the left column and the levels of the other variable across the top row; it doesn’t matter. How can I represent these data in a bar graph?

Again, highlight all the cells (including the headings) and follow the same instructions as before to create a 2-D clustered column chart. When you see a preview of your figure, you’ll notice that the different criminal record conditions are displayed along the x-axis, and that gender of defendant appears in the legend (one bar for male and one bar for female at each level of the other variable). I think this format makes sense for these data, but if you wanted to reverse the placement of these variables (e.g., have gender of defendant along the x-axis and the other variable in the legend), you could go to the “Chart” toolbar, and under the “Data” option, select “Switch Plot”.

Now that you have two bars at each level of the criminal record IV, you should create bars of contrasting colors, still using shades of black and grey. Below is my completed figure:

![Bar graph showing mean ratings](image)

Figure 2. Mean rating of defendant’s guilt as a function of defendant’s gender and information about defendant’s prior criminal record.

Adding Error Bars

Often, it is useful to include in your figure error bars that indicate one standard error above and below the mean for each level of the IV. Doing so gives your viewer a sense of the variability of the data. To create the error bars, you simply type the standard errors into the spreadsheet, as I’ve done below for the first example (you can find the standard errors on the SPSS printout):
Once you’ve created the bar graph in Excel, you can double-click on the bars as you did before when you changed their color. When the “Format Data Series” window appears, choose “Error bars” from the list on the left, as shown below.

Make sure that the “Both” error-bar type is selected (this is the default). This will give you error bars depicting one standard error above and one standard error below the mean. On the right, choose “Cap” for the error bar style. Now click on the button labeled “Custom,” then “Specify Value.” You’ll see the dialog box below.

Click in the box next to “Positive Error Value.” In the spreadsheet, select the three standard error values you inputted. They will automatically appear in the white box. Repeat this process in the white box next to “Negative Error Value” and click OK.

The new bar graph appears below. Note that in order to make the error bars stand out, I changed the bar colors to light grey and removed the horizontal lines on the graph. As per APA style, you should note in the figure caption what the error bars represent.

![Bar Graph](image)

**Figure 3.** Mean rating of defendant’s guilt as a function of information provided about defendant’s criminal record. Error bars represent one standard error above and below the mean.

If you can’t figure something out, use the Excel “Help” menu. Have fun!