Instructions for producing an error bar graph in Microsoft Excel

Step 1. Open a worksheet in MS EXCEL and enter the data in the following format:

<table>
<thead>
<tr>
<th>Treatment</th>
<th>0.1 M</th>
<th>0.2 M</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.1 M</td>
<td>.29</td>
<td></td>
</tr>
<tr>
<td>0.2 M</td>
<td></td>
<td>.43</td>
</tr>
</tbody>
</table>

Note: it is crucial that the means be in neither the same row nor column!

The first column contains the labels for the two treatments.
The second column contains the mean for treatment 1 (0.1M).
The third column contains the mean for treatment 2 (0.2M).

Step 2. Highlight the data, including the labels in the treatment column.

Step 3. Click on the chart Wizard icon on the toolbar (it is the small bar graph). Or you can click on (insert/chart) in the menus.

Step 4. Select under chart type Line from the list of chart types and select the subtype with markers displayed at each data value (this is usually the second choice in the first column for Excel). Then click next.

Step 5. Under Data Range click series in: Columns

Step 6. Click the Series tab.
Step 7. Check the following settings under the Series window.
If everything worked right, you shouldn’t have to change anything, but you can use these steps to fix any problems.

A. Category (x) axis labels

Click on the red arrow by the category axis labels; when the excel sheet is visible highlight the category column (the first column with the treatment names and only highlight the names, not the title of the column)

B. Series labels:

These should be series 1 and series 2. If they are there, go on to the next step. If there are no series listed you will have to add the series (means of treatment 1 and treatment 2). Click on the add button, then for series1, click on the red arrow in the values category. This will take you to the worksheet. Highlight the column with the first mean and press return (or click on the red arrow). Repeat this process for the 2nd mean.

After setting both the series and category labels click next.

Step 8. Click on each of the tabs to display the available options

**Titles:** a) Do not give the chart a title

b) Type in the label for the X-axis title: this is the independent variable – Acid concentration (M)

c) Type in the label for the Y-axis title: this is the dependent variable- Change in mass (g)

**Gridlines:** turn off gridlines by clicking on each checkmark until none are displayed.

**Legend:** Turn off the legend by clearing the “show legend” box (no checkmark displayed)
Step 9. Click next and then finish.
Step 10. You will now have a chart with a marker in a column for each independent variable category. Drag the cursor over one of the markers until a label pops up over the marker, then double click with the mouse.

This will open a format data series box.

Select the Y Error Bars tab.

Under Display click on the Both option then click fixed value.

Enter the value of 2*SE in the box to the right.

Select the patterns tab; under marker, select style and change the marker to a horizontal line. You can also change its size and colors in this menu.

To exit click ok.

Step 11. Repeat step 10 for each independent category (each marker should now have error bars)

Step 12. Other editing: You can edit most of the things in your graph by double clicking on the item. This will bring up a menu which you can use to make changes to the graph. The most frequent such change you may make is adjusting the x or y scale (double-click on the appropriate axis to bring up the menu). Remember that there is no need to start an axis at zero, particularly if doing so squeezes all of your data into one part of the graph. Play with different high and low values until you get a graph with the data nicely spread (but don’t cut off your error bars!). Once you are happy with the appearance, go to step 13.

Step 13. Select the chart and under the edit command; click copy.


Step 15. Once the new document is open enter return twice and select edit----paste command.

Step 16. Your chart is now in MS word and you can add the Figure Caption.

Figure 1. The mean weight change (grams) in antacid tablets exposed for ten minutes to one of two different acid concentrations. N=10 antacids per concentration. The means are represented by the central horizontal lines. The error bars represent the 95% confidence interval.