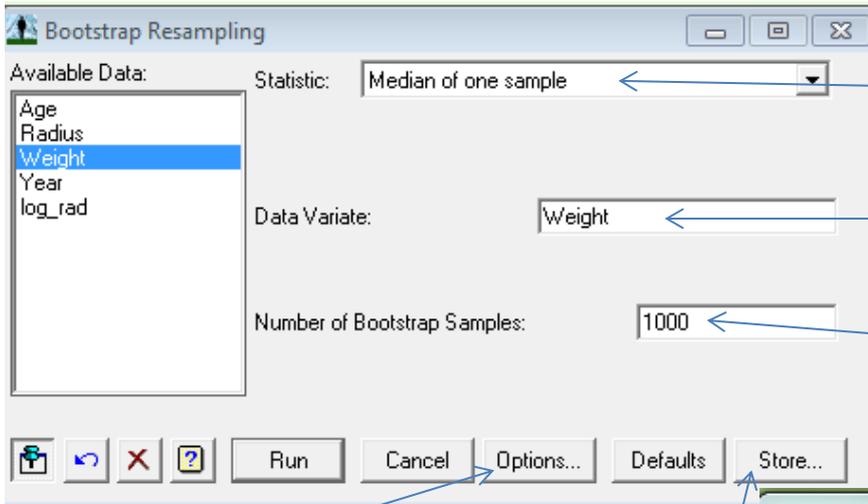


Bootstrapping

To create a “bootstrap” 95% interval from a sample you have taken from a population you simply use the **Bootstrap** option from the **Stats** menu and you will get the following dialog box.



You probably at this level only want mean or median here

The sample variable

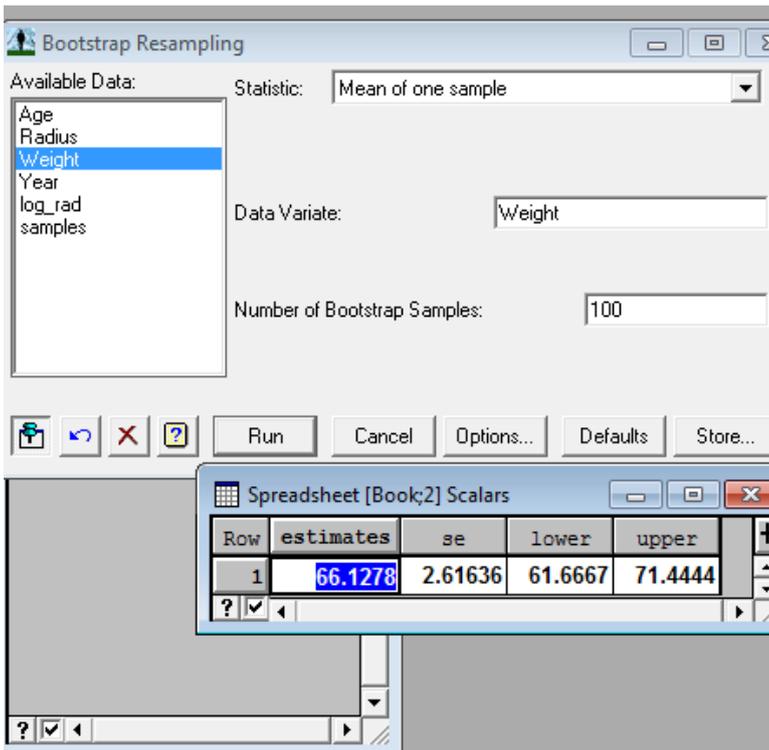
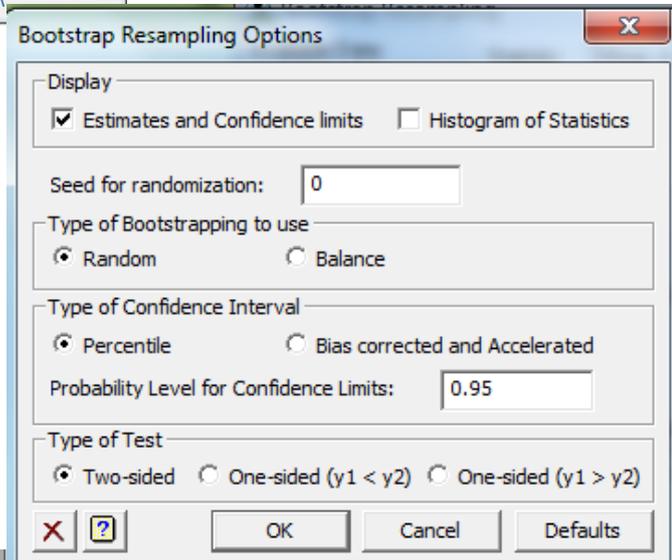
The number of times you wish to re-sample

The **Options** can be altered but you will usually be constructing a two-sided 95% bootstrap interval.

You then go to the **Output** menu to get the results.

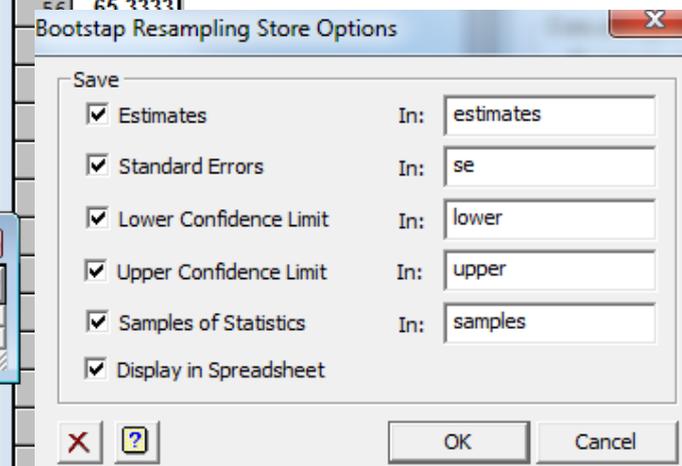
```
95% confidence interval
mean          s.e.    lower  upper
Median 66.14    3.77   57.00 70.00
```

You can also store your sample medians/means and the bootstrap interval estimates by using the **Store...** option



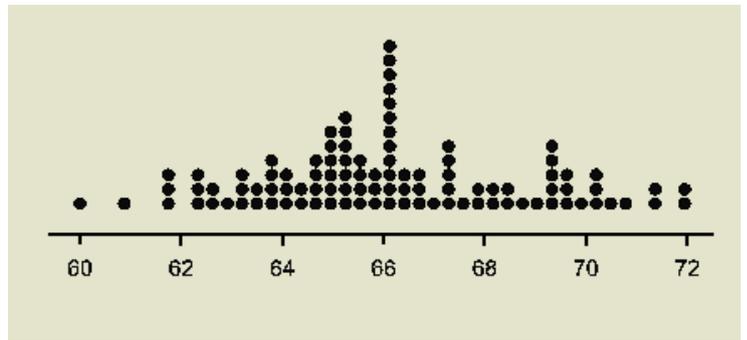
Row	samples
52	64.8889
53	64.5556
54	63.4444
55	65.6667
56	65.2222

You will need to name the columns you are creating as shown below

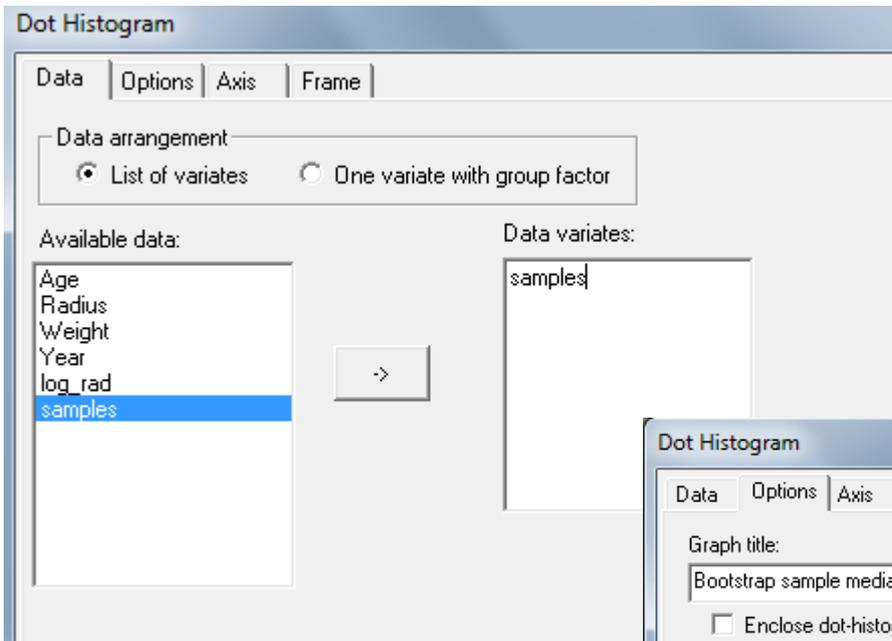


69	64.7778
70	70.2222
71	67.3333
72	69.2222

To graph your bootstrap sample medians as shown opposite, you choose a **Dot histogram** from the **Graphics** menu.

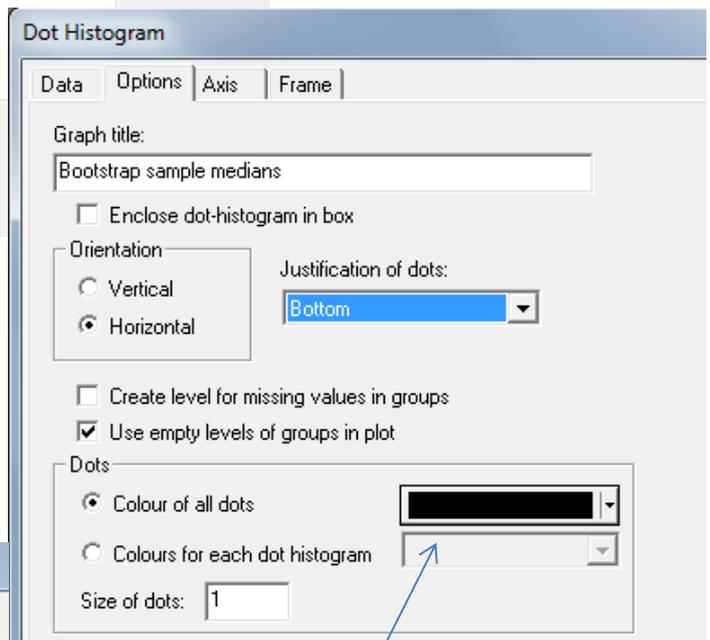


Select the name of the column you stored the bootstrap sample medians in as shown below

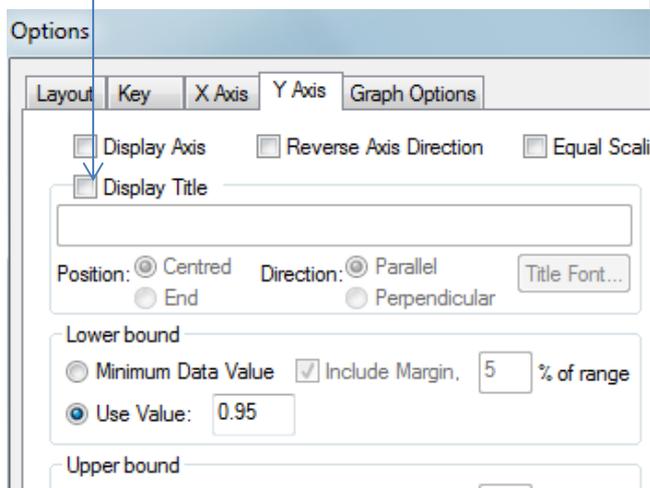


You will need to make some adjustments to the **Options** as shown below.

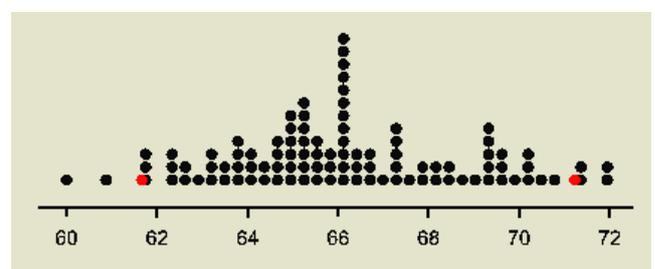
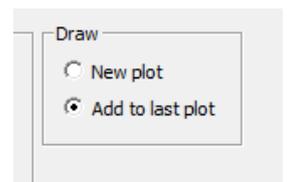
- Remove enclose in box
- Change orientation to horizontal
- justification to Bottom



This will give you the graph but you will still have the y axis showing. If you wish to remove this, go to **Edit graph** and choose **Y Axis** from the **Edit** menu and then click the Display Axis toggle off as shown.



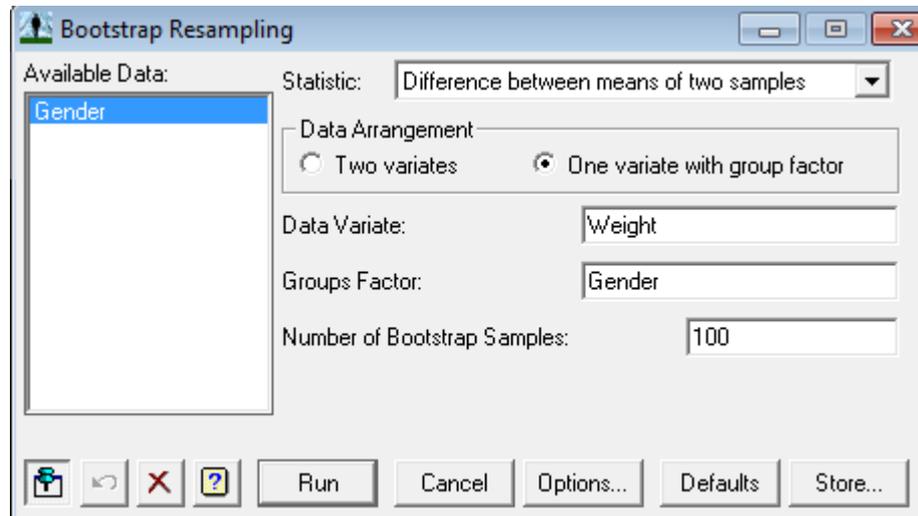
If you wish to see the bootstrap interval on your graph, just add a new column  to your spreadsheet and type in the two values. You can now graph these as you did before **BUT** you need to change the colour of the dots and click on **Frame** and select add to last plot toggle.



You can also bootstrap the difference between 2 means.

Open the file *Weight30MF*, making the gender a factor when prompted - the ! means the data in the groups represents grouping .

Use the **bootstrapping** option from the **Stats** menu as before and fill out the dialogue box as shown below:

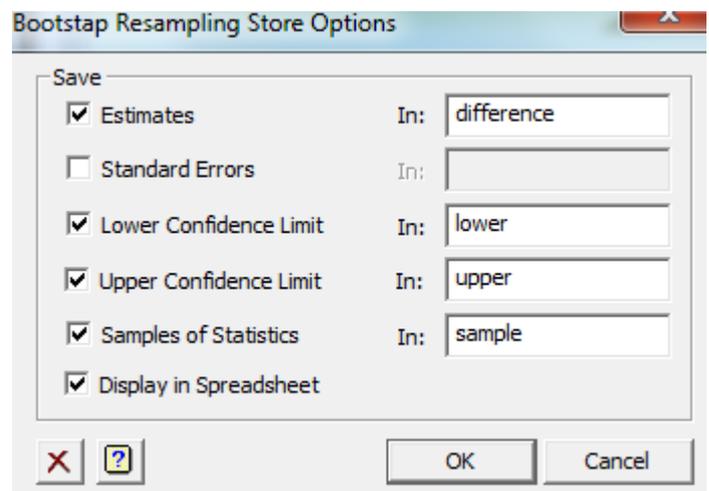


Row	Weight	Gender
1	65	f
2	110	m
3	45	f
4	65	m
5	75	f
6	47	f
7	54	f
8	63	m
9	55	f
10	52	f
11	50	f
12	108	f
13	47	f
14	75	m
15	52	m

Click on **Store...** and fill in the dialogue box to save your results in a spreadsheet.

You will usually want to create a 95% interval so you won't need to alter the **Options**

Now click on **Run**.



Row	Weight	Gender	sample
1	65	f	-10.1176
2	110	m	-10.629
3	45	f	-9.02262
4	65	m	-4.8914
5	75	f	-15.914
6	47	f	-20.4389
7	54	f	-4.68778
8	63	m	-2.75566
9	55	f	-4.01357
10	52	f	-0.266968
11	50	f	-6.94118
12	108	f	-12.4253
13	47	f	-0.316742

Row	difference	lower	upper
1	-10.8457	-25.7557	2.40724

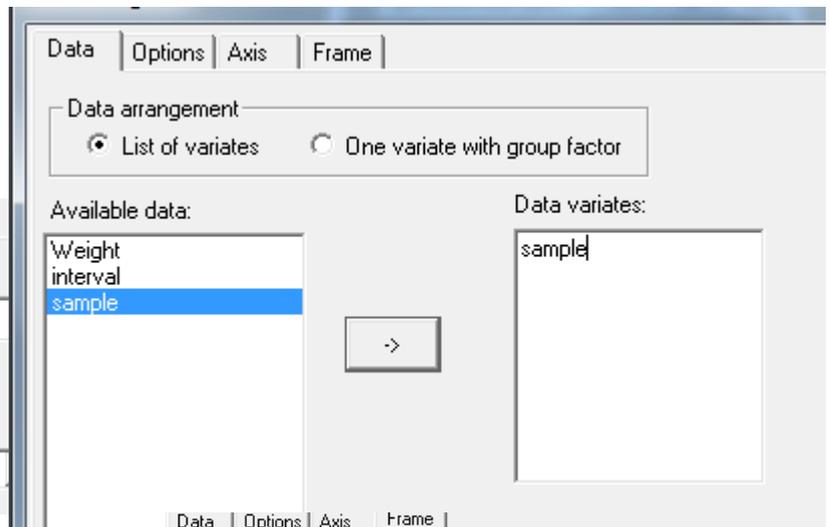
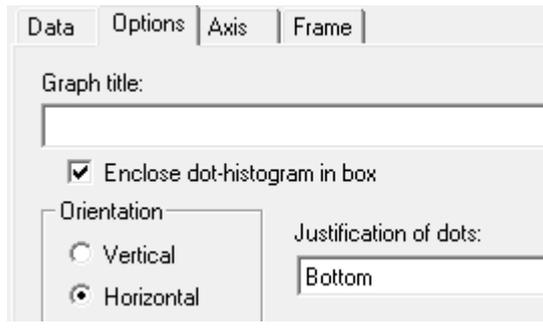
The sample is the difference between the two means after each re-sampling. The lower and upper give the 95% interval.

To graph, add a new column  name it interval and enter in the lower and upper values from the Output.

Row	sample	interval
1	-10.1176	-25.7557
2	-10.629	2.40724
3	-9.02262	*
4	-4.8914	*

To graph, choose **Dot histogram** from the **Graphics** menu:

Use the **Options** tab to change the alignment.



Use the **Frame** tab to change to full screen

Now repeat for the *interval* but change the colour of the dots to red (use the Options tab) and click on **Add to last plot** (use the Frame tab)

