



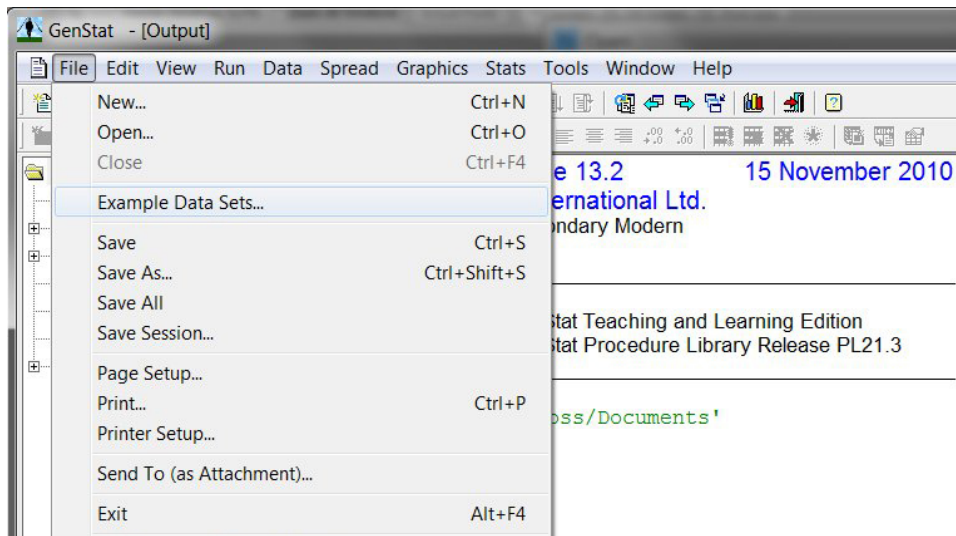
Impact of Group Rejections on Self Esteem

In 2005, researchers from the School of Physical Education at the University of Otago carried out a study to assess the impact of rejection on physical self esteem. Physical self esteem indicates how you evaluate yourself physically, and there are two kinds of self esteem. Trait self esteem is stable over time, whereas state self esteem, which reflects current feelings, is changeable. High trait self esteem is associated with positive qualities such as life satisfaction, leadership, resilience to stress and confidence.

In the study, the physical self esteem of 100 University of Otago students was assessed using the Physical Self-Description Questionnaire, which features 70 questions such as “are you good at sports?” and “are you happy with yourself physically?”, to which students respond on a scale of 1 (false) to 6 (true). This questionnaire was administered to each participant three times. The first time was to see how they usually feel about themselves (i.e. to measure their trait physical self esteem (TPSE)). They were then told a story about how they had been rejected from a group activity, and were re-administered the questionnaire to assess their state physical self esteem. They were either told that the rejection was completely by chance, or was due to their physical qualities. They were then told the other rejection story, and asked to fill in the questionnaire again.

The researchers were interested to see whether high TPSE students were able to maintain their self-esteem better than low TPSE students when rejected from the group activity, as well as whether self-esteem decreases more significantly when rejection is physical qualities rather than purely by chance. This lesson looks at some of these questions using the data collected in the study.

1. To open the data we click on **File>Example Data Sets**:



This brings up the Example Datasets dialog. Click on the **Filter by topic** drop-down menu and select the **NZ Schools Example Data sets** option. Choose the file **SelfEsteem.gsh** and click on **Open data**.

A screenshot of a spreadsheet window titled 'Spreadsheet [SelfEsteem.GSH]'. The spreadsheet contains a table with 17 rows and 6 columns. The columns are labeled 'Row', 'Subject', 'Sex', 'Trait_PSE', 'State_PSE_1', and 'State_PSE_2'. The data is as follows:

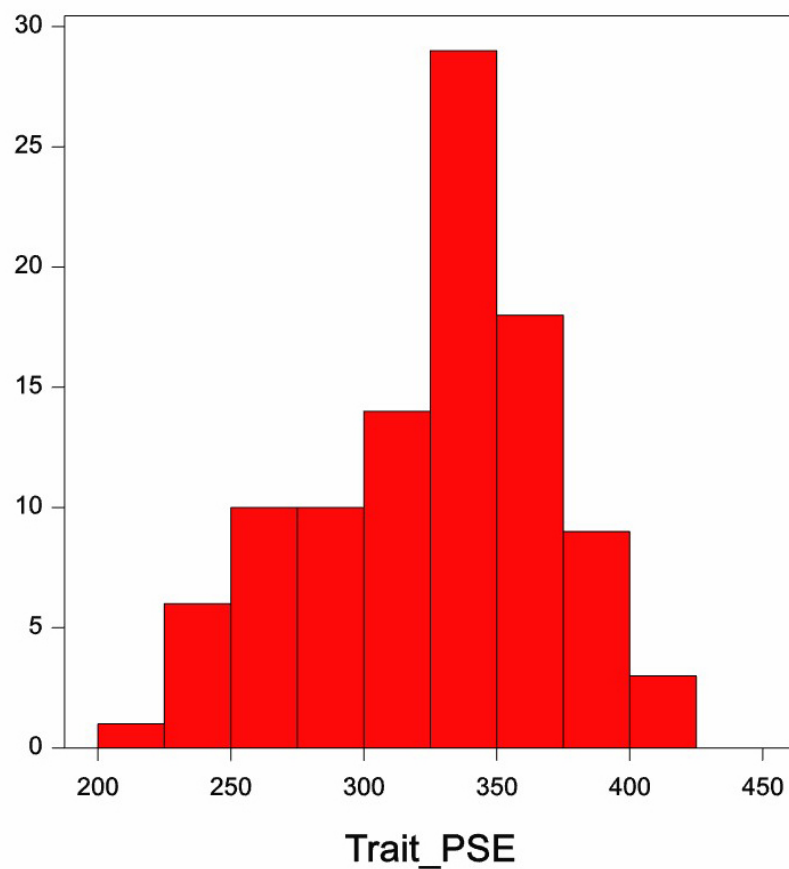
Row	Subject	Sex	Trait_PSE	State_PSE_1	State_PSE_2
4	PE student	Male	372	347	203
5	PE student	Female	275	208	178
6	PE student	Female	344	320	218
7	PE student	Male	368	368	266
8	PE student	Female	331	312	124
9	PE student	Female	252	258	183
10	PE student	Female	378	311	269
11	PE student	Female	335	293	249
12	PE student	Female	348	316	231
13	PE student	Female	372	380	250
14	PE student	Male	366	289	80
15	PE student	Female	287	264	202
16	PE student	Female	282	202	167
17	PE student	Female	366	333	180

This opens a spreadsheet containing the five variables **Subject**, **Sex**, **Trait_PSE**, **State_PSE_1** and **State_PSE_2**. **Subject** is a factor that tells us whether the par-

participant studies Physical Education, and **Trait_PSE**, **State_PSE_1** and **State_PSE_2** contain the students' total physical self esteem scores on the questionnaire in normal conditions, after rejection by chance, and after rejection due to physical qualities respectively.

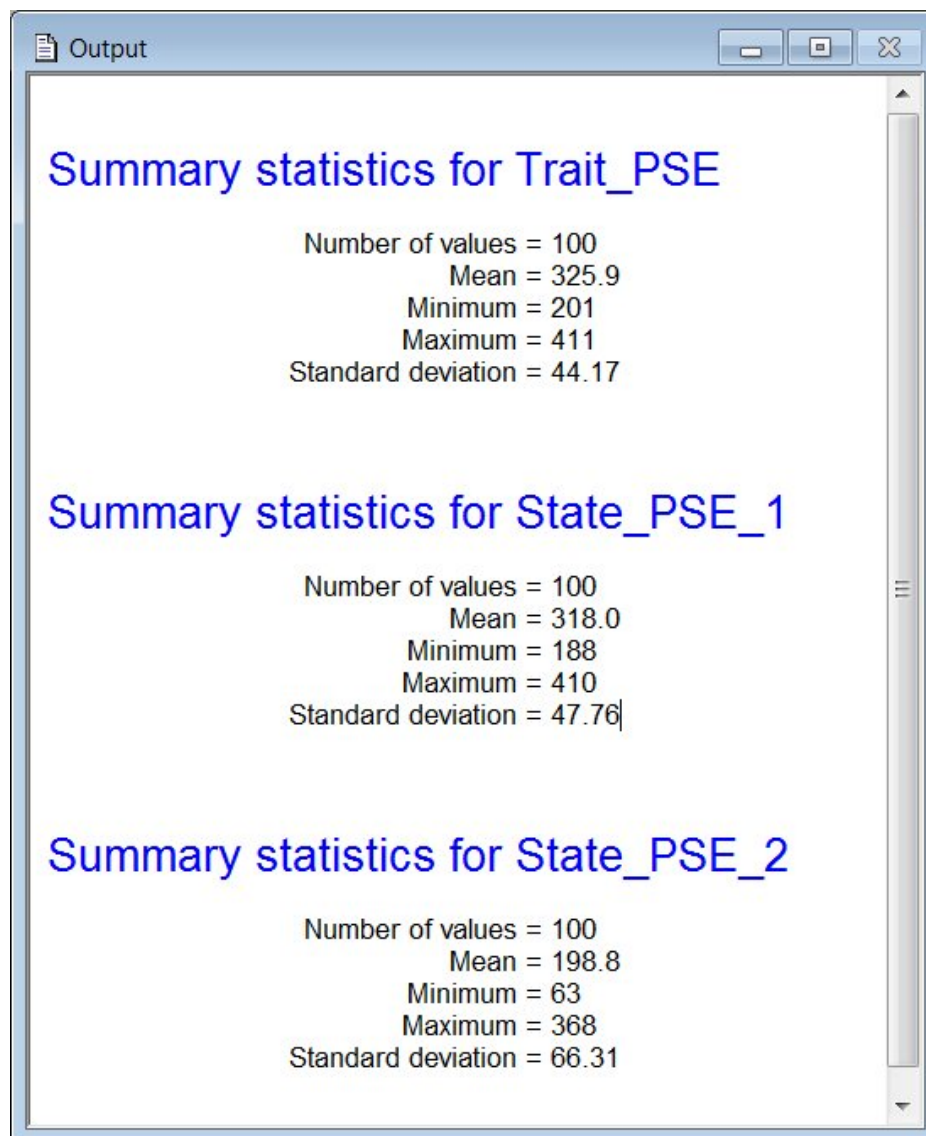
These total scores are calculated by adding the scores on each positive question (like "I am good at sports"), then subtracting the scores on each negative question (like "I am too fat"), with 7 added onto the score for every negative question. Can you think of why the total is calculated like this?

2. Check the distribution of totals in the different groups to see if the totals are close to normally distributed. To do this, click on **Graphics>Histogram** and enter one of the variables, then click **Run**. The histogram for the TPSE is as follows:

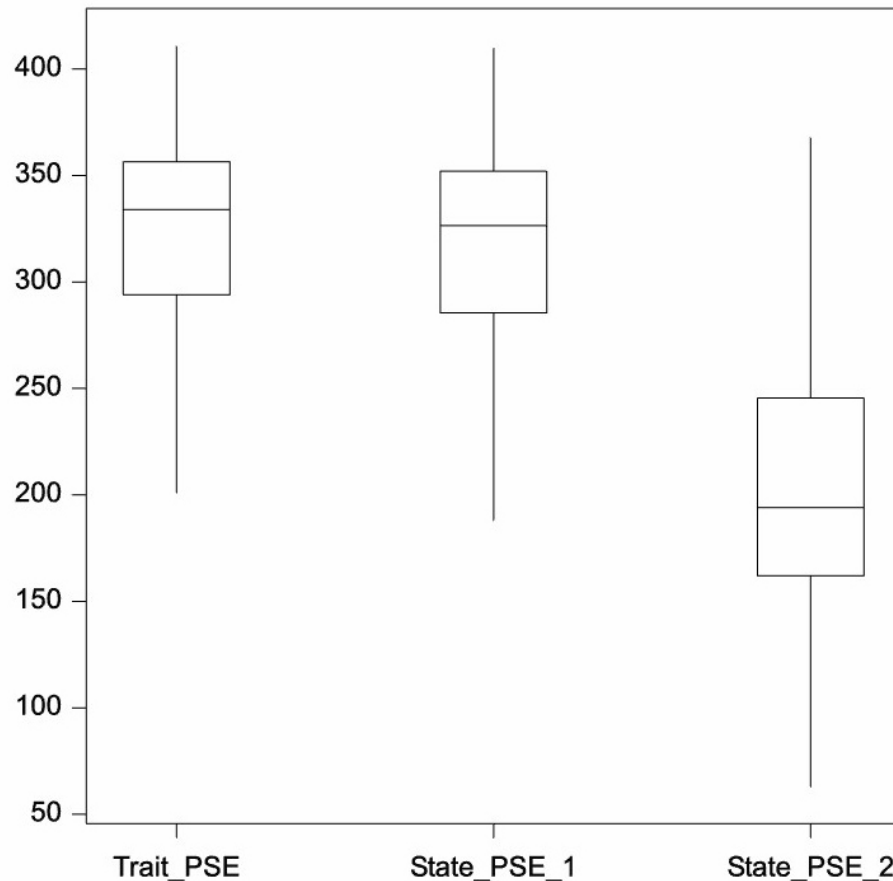


Do the data appear roughly normal, or is a transformation of the data necessary?
Create histograms for the other two conditions and comment on these.

3. Compare the self esteem scores from the three conditions to see if the rejection impacts on physical self esteem. To do this, click on **Stats>Summary Statistics** and enter the three score variables into the **Variates** box. Tick the **No. of Non-missing Values**, **Arithmetic Mean**, **Minimum**, **Maximum** and **Standard Deviation** boxes, then click **Run**. To see the following table, minimise the spreadsheet and maximise the output tab (bottom of the page).

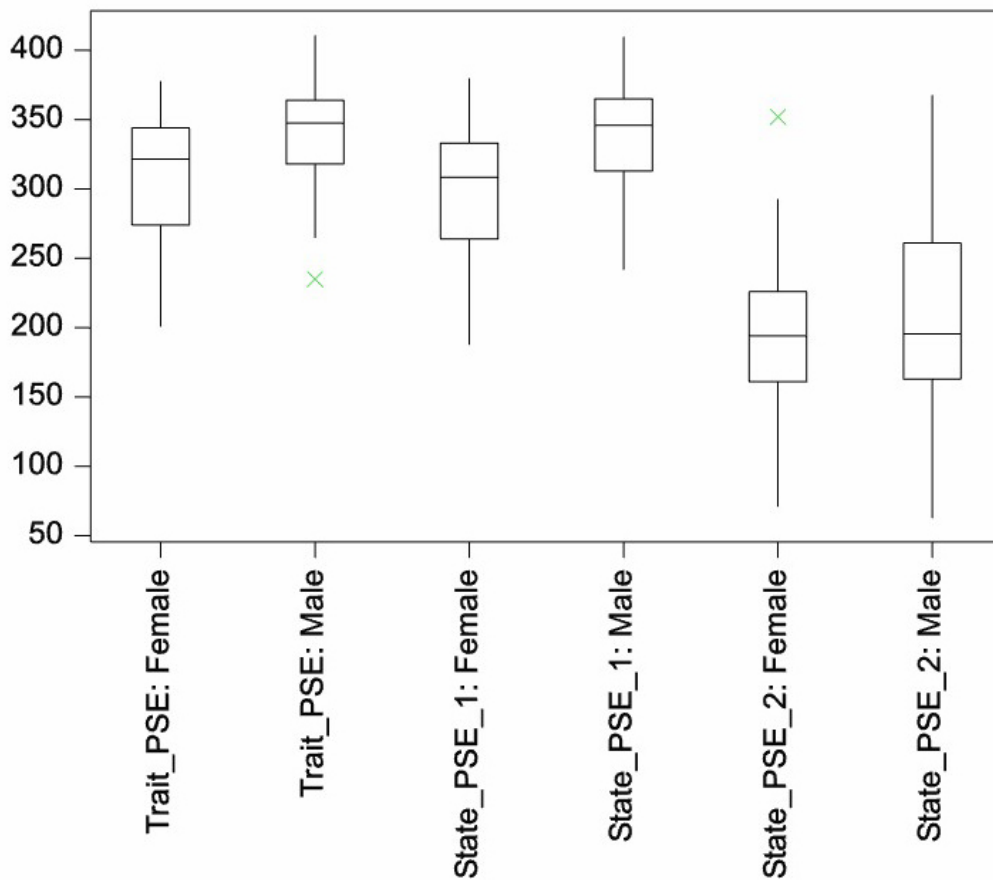


To display these results graphically, click **Graphics>Boxplot**, and enter the three score variables into the **Data Variates** box. Click **Run** to obtain the following graph:



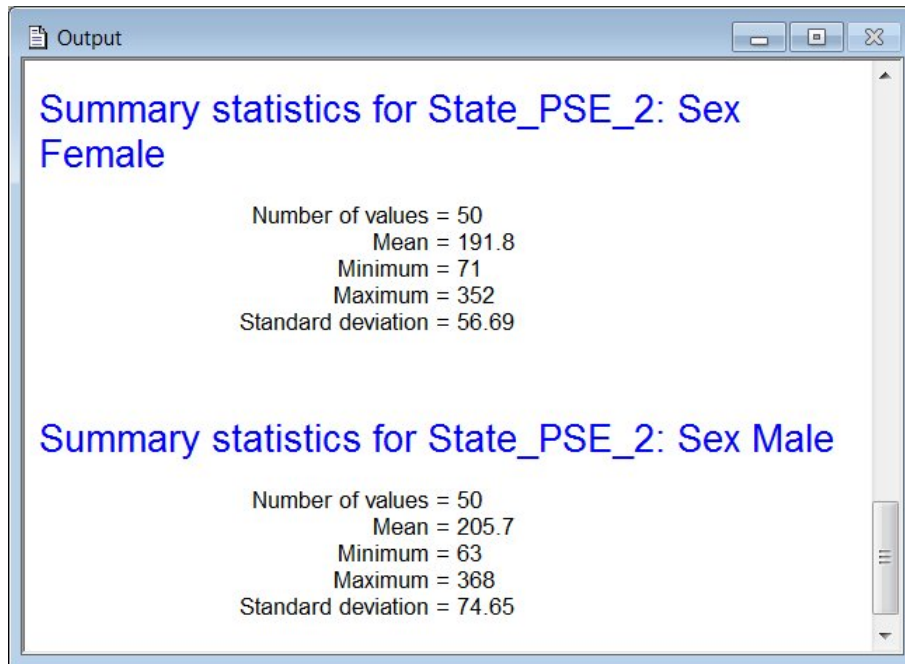
Using the summary statistics and/or the boxplot, discuss the impact of the rejections on the self esteem scores. Use the summary statistics to calculate 95% confidence intervals for the differences between each pair of conditions, and report your findings.

4. Compare the self esteem scores at each of the three conditions for males and females using the same process as before, but also entering **Sex** into the **By Groups** box in the **Summary Statistics** window. When creating the boxplot, check the **variate(s) with multiple grouping factors** box in the **Boxplot** window and enter **Sex** three times into the **Grouping factors** column.



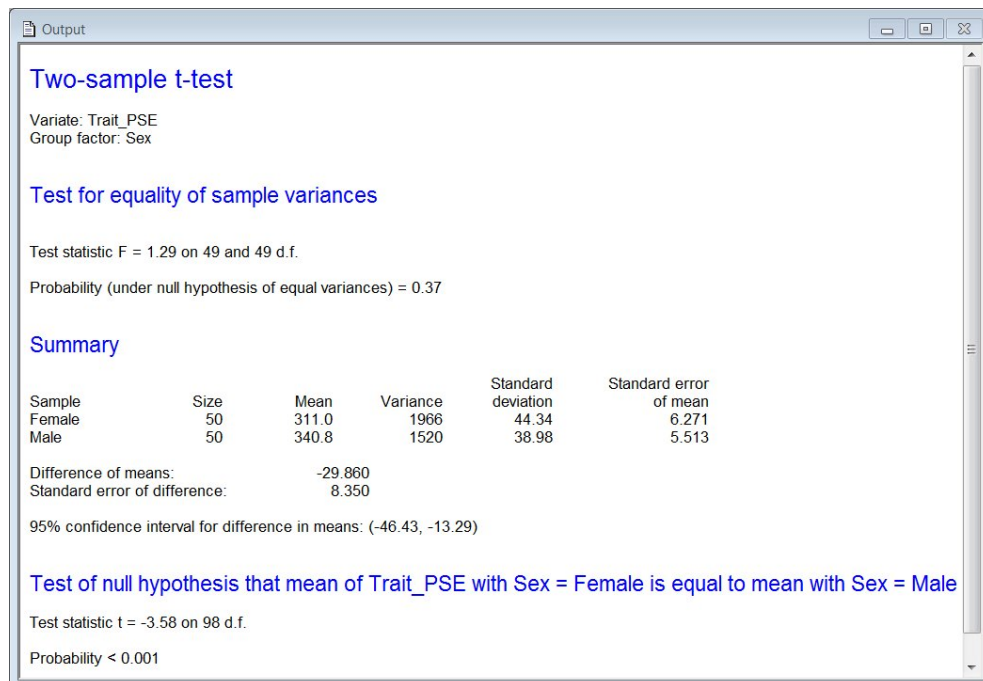
Discuss any visible patterns from the boxplot, being sure to comment on any difference (or lack thereof) in self esteem scores for males and females on both an overall level as well as at each condition.

Using the summary statistics, construct 95% confidence intervals by hand for the difference in mean scores for males and females at each condition, and report your findings (the summary statistics for **State_PSE_2** are provided, but you will have to calculate the others).



5. Differences in means can be due to an actual difference, or simply random variation. A t-test is one way to test whether the difference in means is significantly large, and it turns out that this method is equivalent to considering whether zero is in the confidence intervals that you just calculated.

To carry out a t-test for the difference in the means, click on **Stats>t-tests**, change the type of test to a **two-sample** test, and the data arrangement to **Group factor with variate**. Enter **Trait_PSE** as the data variate and **Sex** as the Group factor. Click **Run** to obtain the following results.



With a t-test, a ‘large’ test statistic suggests that the difference in means is not equal to zero. To assess whether the test statistic is ‘large’ enough, we look at the probability value, and if it is less than 0.05 (for a test equivalent to using a 95% confidence interval), then we conclude that there is indeed a significantly large difference in means.

Is this the case here?

6. Using some of the methods shown to compare the male and female self esteem scores, now compare the self esteem scores for PE students and non-PE students, and report your findings.
7. Calculate new variables **Change_1** and **Change_2** to measure the change in self-esteem scores after each rejection. To do this, click on **Data>Calculations**, enter **Trait_PSE-State_PSE_1** into the box at the top, and then type **Change_1** into the **Save Result in** box. Repeat the process to calculate **Change_2**, using **State_PSE_2** instead of **State_PSE_1**.

Discuss patterns in the change in self esteem scores after rejection, perhaps using boxplots or summary statistics. Be sure to mention if the change is larger for males or females, and whether the change is larger for PE students or other students.