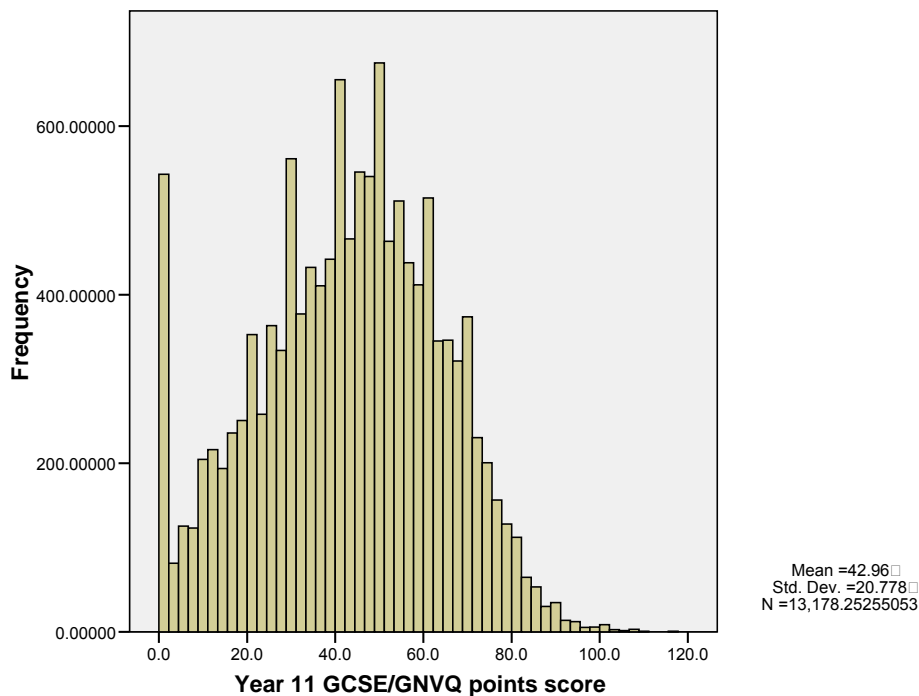


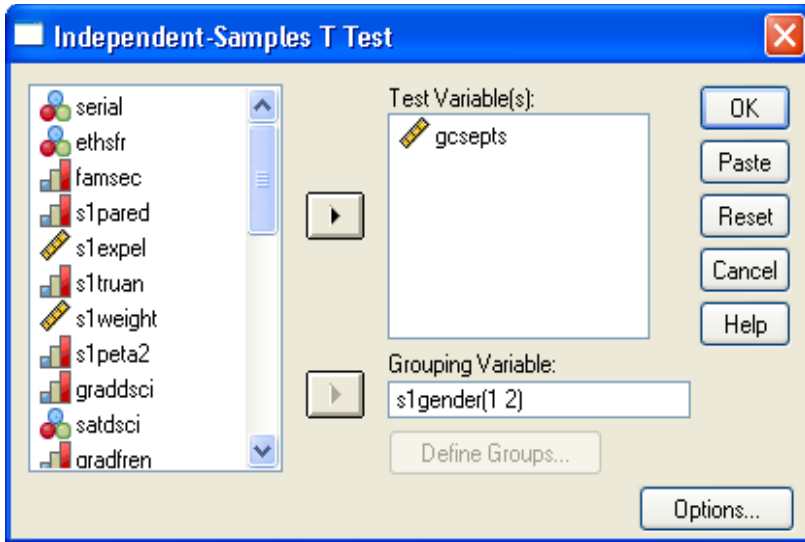
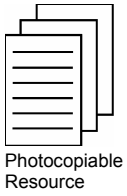
## Answers to Exercise 6.4 (p. 208)

First of all, check to see that you have weighted your dataset with the variable 's1weight' (see Figure 2.5 on p. 52 for how to do this). Once this has been done, you need to check that the first two of the three conditions for a t-test have been met (i.e. the dependent variable is scale and it is also approximately normally distributed). The variable 'gcsepts' is a scale variable and its distribution can be checked using the **Graphs → Legacy Dialogs → Histogram...** procedure. As can be seen below, there is a 'floor effect'. You do have the option at this point to conclude that the distribution is not sufficiently normal and thus to run a Mann-Whitney Test instead (which is what I would probably do to be on the safe side). However, the t-test has been shown to be pretty robust and it would be quite common for people to conclude that while there is a floor effect the overall shape of the distribution is approximately normal and thus that the second condition has been met also. As this is an exercise about doing an independent t-test then we will also go opt for this latter interpretation as well!



Cases weighted by Final weight for sweep 1 (rev June 06)

With both of these conditions having been verified we can proceed to run the procedure **Analyze → Compare Means → Independent Samples T Test...** as shown overleaf:



The main output you should gain is as below. As can be seen, the third condition (equal variances) has not been met so we need to use the corrected results listed on the 'Equal variances not assumed' line.

**Group Statistics**

	S1 Gender	N	Mean	Std. Deviation	Std. Error Mean
Year 11 GCSE/GNVQ points score	Male	6666	40.453	20.9271	.2563
	Female	6513	45.533	20.3076	.2516

**Independent Samples Test**

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Year 11 GCSE/GNVQ points score	Equal variances assumed	14.163	.000	-14.138	13176	.000	-5.0801	.3593	-5.7844	-4.3757
	Equal variances not assumed			-14.143	13175.637	.000	-5.0801	.3592	-5.7842	-4.3760

As for the effect size,  $r$ , this can be calculated using the formula given in the book (p. 206) as:  $\sqrt{[14.1432/(14.1432 + 13175.637)]} = 0.122$ .

We can therefore pull all this together and report the findings as follows:

Girls were found to have a higher mean GCSE score (mean=45.5, sd=20.3) compared to boys (mean=40.5, sd=20.3) ( $p < 0.001$ ,  $t = 14.143$ ,  $df = 13175.637$ ). However, the size of this difference was found to be relatively small ( $r = 0.122$ ).