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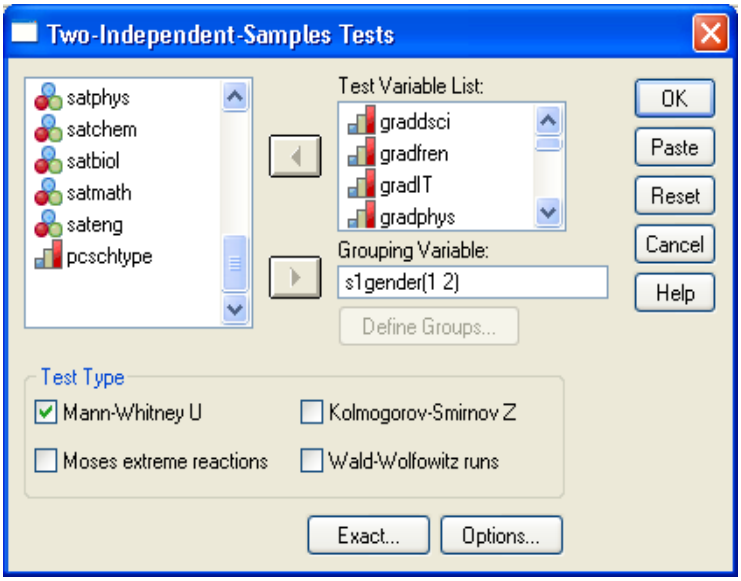
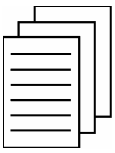
Answers to Exercise 6.2 (p. 194)

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 can then generate contingency tables showing differences between boys and girls in relation to grades achieved in the various GCSE examinations included in the **youthcohort.sav** dataset.

To do this we need to use the **Analyze → Nonparametric Tests → Two Independent Samples…** procedure. Fortunately, rather than running this procedure separately for each examination they can all be run at once. Place the variable 's1gender' in the 'Grouping Variable:' field and then all of the relevant variables listing the grades achieved by students for each of the examinations (i.e. 'graddsci', 'gradfren' and so on) into the 'Test Variable List:' field as shown below.



All you now need to do is to press 'OK' and you should get the output overleaf:



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Mann-Whitney Test

Ranks

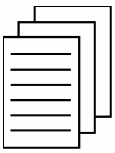
	S1 Gender	N	Mean Rank	Sum of Ranks
Double Science Grade	Male	6734	7257.25	48870350.00
	Female	7337	6832.93	50133206.00
	Total	14071		
French Grade	Male	3284	4100.70	13466713.00
	Female	4112	3377.28	13887393.00
	Total	7396		
IT GCSE Grade	Male	1067	948.44	1011981.00
	Female	753	856.75	645129.00
	Total	1820		
Physics Grade	Male	624	543.26	338993.50
	Female	464	546.17	253422.50
	Total	1088		
Chemistry Grade	Male	633	570.76	361292.00
	Female	486	545.98	265348.00
	Total	1119		
Biology Grade	Male	615	567.79	349189.50
	Female	498	543.68	270751.50
	Total	1113		
Maths Grade	Male	6455	6877.45	44393961.00
	Female	7127	6713.65	47848192.00
	Total	13582		
English Grade	Male	6384	7472.75	47706015.50
	Female	7110	6096.31	43344749.50
	Total	13494		

Test Statistics[a]

	Double Science Grade	French Grade	IT GCSE Grade	Physics Grade	Chemistry Grade	Biology Grade	Maths Grade	English Grade
Mann-Whitney U	23213753	5431065.000	361248.0	143993.5	147007.000	146500.500	22447564.0	2E+007
Wilcoxon W	50133206	13887393.000	645129.0	338993.5	265348.000	270751.500	47848192.0	4E+007
Z	-6.280	-14.653	-3.715	-.155	-1.305	-1.278	-2.462	-20.843
Asymp. Sig. (2-tailed)	.000	.000	.000	.877	.192	.201	.014	.000

a. Grouping Variable: S1 Gender

As can be seen, there is no evidence of any differences in grades achieved by boys and girls in relation to Physics (p=0.877), Chemistry (p=0.192) or Biology (p=0.201). In addition, as the mean rank for the girls is lower than for the boys in relation to the remaining subjects then this indicates that girls have tended to achieve higher grades than boys on average in all of the other subjects (remember that these ordinal variables were coded as 1=A*, 2=A, 3=B etc. and so the smaller the rank, the higher the grades achieved).



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Finally, in terms of effect sizes, we only need to calculate these for the subjects where the sex differences were found to be statistically significant. Using the formula for the effect size given in the book (p. 193) we get:

Double Science:	6.280 / √14071	=	0.053
French:	14.653 / √7396	=	0.170
IT:	3.715 / √1820	=	0.087
Maths:	2.462 / √13582	=	0.021
English:	20.843 / √13494	=	0.179

As can be seen, the largest differences between boys and girls was found in relation to English (r = 0.179) followed by French (r = 0.170). It is important to point out however that in reality there are dangers associated with conducting multiple statistical significance tests like this in relation to the increased risk of committing a Type I Error. This is explained in more detail later in this chapter (see p. 197 and discussion of the 'Bonferroni Correction').