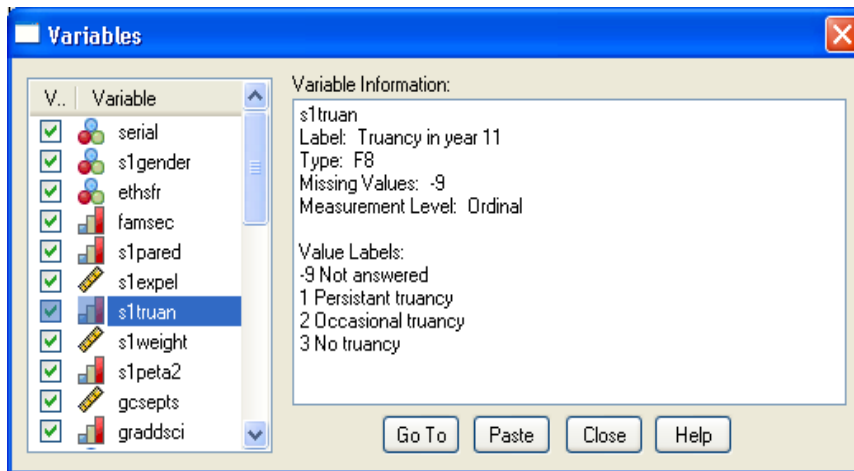
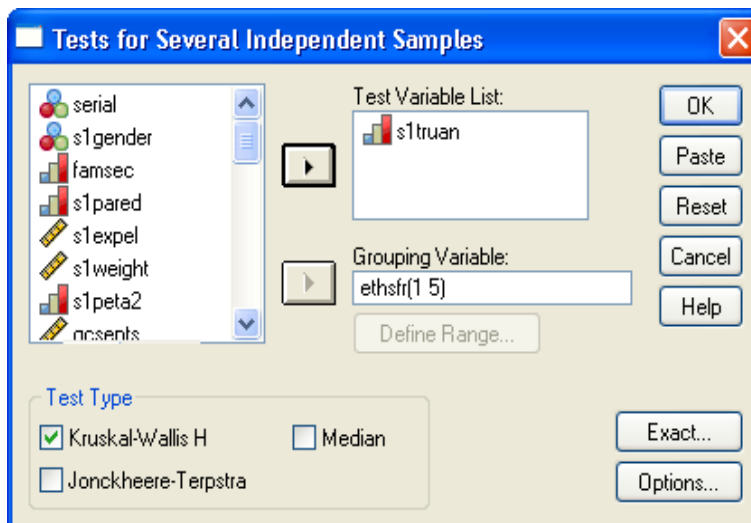


Answers to Exercise 6.3 (p. 198)

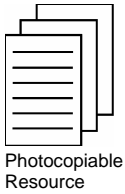
First of all, check to see that you have weighted your dataset with the variable 's1weight' (see Figure 2.5 on p. 52 for how to do this). Also, it is important to check that the ordinal variable ('s1truan') is coded properly. As can be seen from below, the three main categories are rank-ordered properly and further investigation confirms that the missing category '-9' is already classified as missing in SPSS.



As such, we can now run the **Analyze** → **Nonparametric Tests** → **K Independent Samples...** procedure as below:



You can see from the above that the range for 'ethsfr' has been limited to the main five racial/ethnic groups (coded 1 to 5). The remaining two groups are so all-encompassing (i.e. 'Other Asian, Including Chinese' and 'Other Ethnic Group, Including Mixed') that there is little point including them in the analysis as it would not be possible to interpret the results afterwards.



The results from the main Kruskal-Wallis test, as shown below in the output you should have gained, indicates that there are at least some statistically significant differences that exist between the five racial/ethnic groups ($p < 0.001$, Kruskal-Wallis $H = 27.430$, $df=4$):

Kruskal-Wallis Test

Ranks

	Ethnicity for c12s1 SFR	N	Mean Rank
Truancy in year 11	White	11922	6597.22
	Black	379	6218.94
	Indian	392	7001.84
	Pakistani	341	6386.66
	Bangladeshi	131	5600.03
	Total	13165	

Test Statistics^{a,b}

	Truancy in year 11
Chi-Square	27.430
df	4
Asymp. Sig.	.000

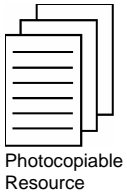
a. Kruskal Wallis Test

b. Grouping Variable: Ethnicity for c12s1 SFR

Remembering that, because of the way the truancy variable has been coded, low scores indicate higher rates of truancy then low mean ranks indicate a higher likelihood of truancy. As can be seen from the output therefore, Bangladeshi pupils were most likely to truant, followed by Black pupils and then Pakistani pupils, White pupils and finally Indian pupils who were least likely to truant.

If we wanted to explore where the differences further then one option would be simply to use a Mann-Whitney Test to see whether differences existed between each of the groups next to one another in the order above. This would therefore require four tests and thus the Bonferonni Correction would give a more stringent significance level of $0.05/4 = 0.012$.

The pairings and the results of the significance tests in each case you should get are therefore provided overleaf:



Bangladeshi and Black pupils ($p=0.061$, Mann Whitney $U = 22496.0$, $Z = 1.871$)
Black and Pakistani pupils ($p=0.484$, Mann Whitney $U = 62980.0$, $Z = 0.701$)
Pakistani and White pupils ($p=0.214$, Mann Whitney $U = 1967764.0$, $Z = 1.243$)
White and Indian pupils ($p=0.019$, Mann Whitney $U = 2129548.0$, $Z = 2.348$)

This is a good example of the 'messiness' that sometimes results from the use of multiple significance tests and a Bonferonni Correction! What we can say is that the difference between White and Indian pupils is approaching statistical significance (set in this case with the Bonferonni Correction at $p=0.012$). As Indian pupils had the lowest rate of truancy and as we know that all of the other racial/ethnic groups had higher rates of truancy than White pupils then we can conclude that there is evidence to suggest that Indian pupils had lower levels of truancy compared to all of the other racial/ethnic groups.

Unfortunately, none of the other tests has proven to be statistically significant. However, this doesn't mean that there aren't further significant differences between specific groups. It is likely, for example, that there will be a statistically significant difference between White and Bangladeshi pupils (given that Bangladeshi pupils had the highest levels of truancy and White pupils the second lowest). However, if we decide to do further tests to explore this then the Bonferonni Correction will require an even more strict level of significance which could possibly become so strict that it renders all differences non-significant.

The key lesson to learn from this example therefore is that when you are comparing a number of groups like this it is best to choose only a small number of post-tests and for these to reflect some existing theory or hypothesis.