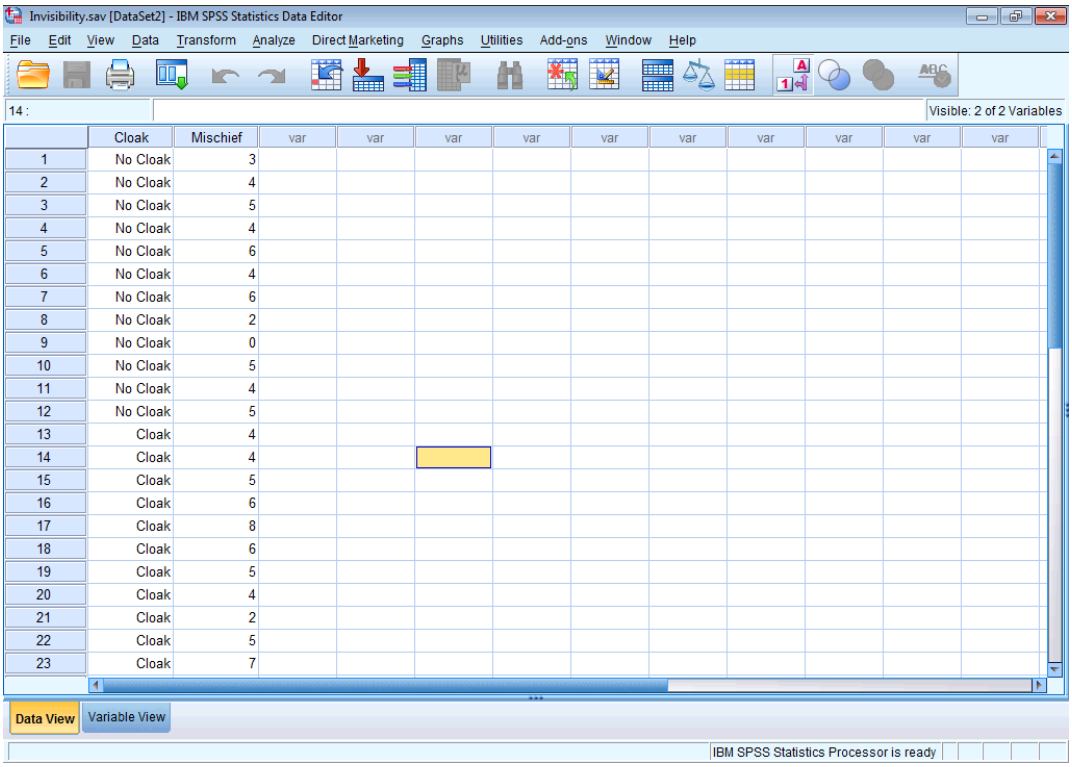
Chapter 9: Comparing two means

Self-test answers

SELF-TEST Enter these data into SPSS.

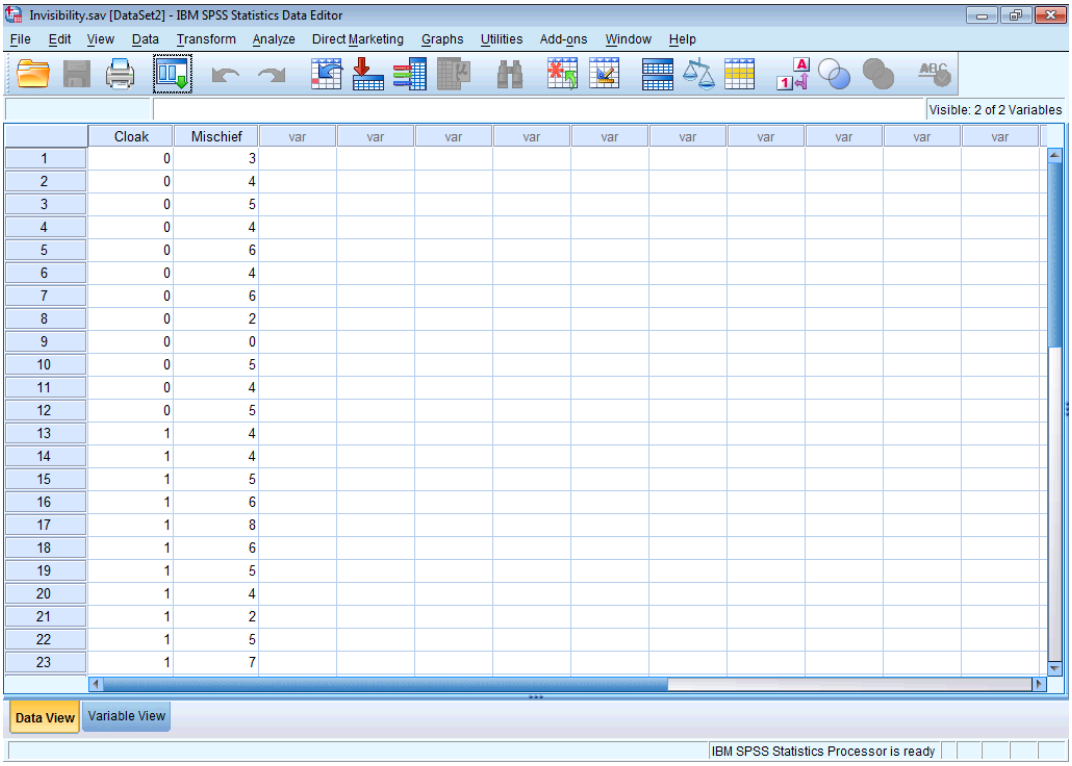
The file **Invisibility.sav** shows how you should have entered the data: the variable **Cloak** records whether or not a person was given a cloak (**cloak** = 1) or not (**cloak** = 0), and **Mischief** is how many mischievous acts were performed.

This is how your data file should look with value labels switched on:



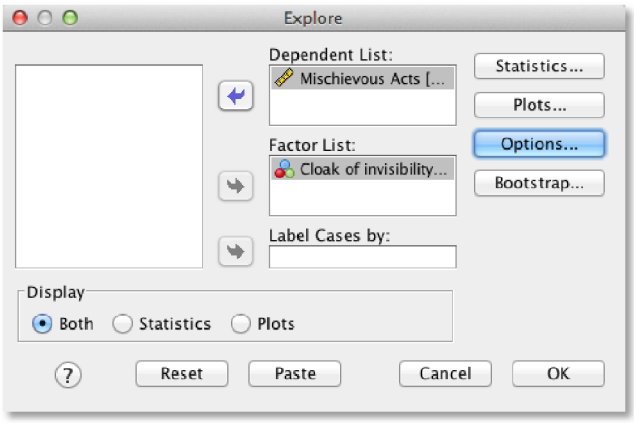
	Cloak	Mischief	var	var	var	var	var	var	var	var	var	var
1	No Cloak	3										
2	No Cloak	4										
3	No Cloak	5										
4	No Cloak	4										
5	No Cloak	6										
6	No Cloak	4										
7	No Cloak	6										
8	No Cloak	2										
9	No Cloak	0										
10	No Cloak	5										
11	No Cloak	4										
12	No Cloak	5										
13	Cloak	4										
14	Cloak	4										
15	Cloak	5										
16	Cloak	6										
17	Cloak	8										
18	Cloak	6										
19	Cloak	5										
20	Cloak	4										
21	Cloak	2										
22	Cloak	5										
23	Cloak	7										

This is how your data file should look with value labels switched off:

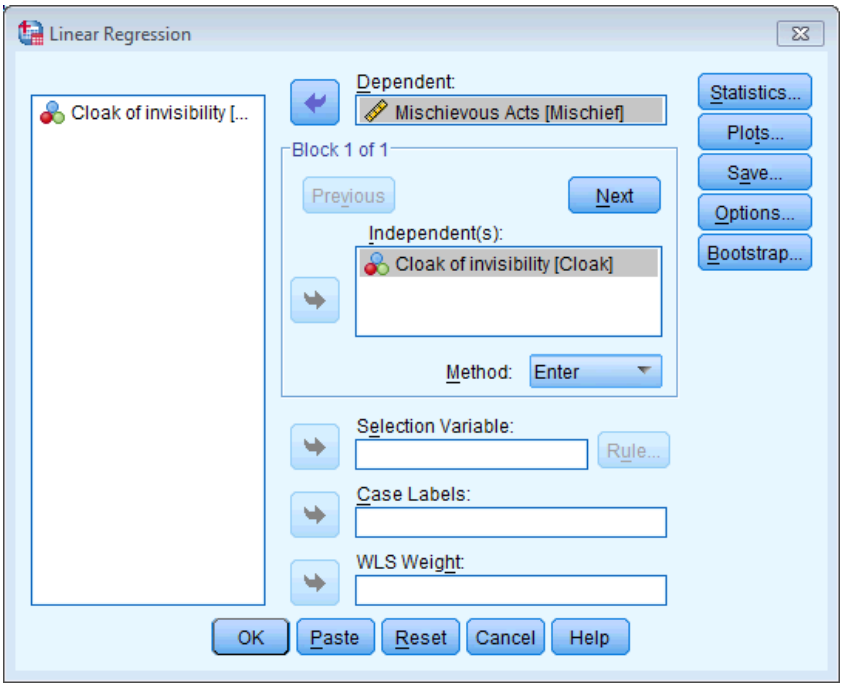


SELF-TEST Produce some descriptive statistics for these data (using *Explore*).

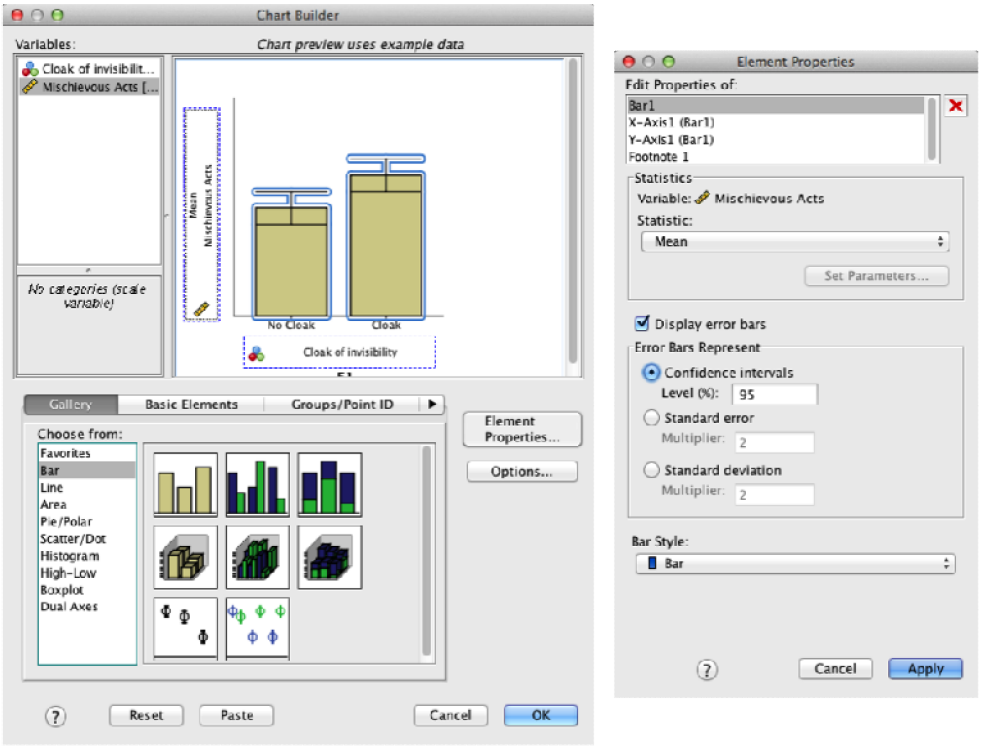
To get some descriptive statistics using the *Explore* command you need to go to Analyze Descriptive Statistics Explore... . The dialog box for the *Explore* command is shown below. First, enter any variables of interest in the box labelled *Dependent List* by highlighting them on the left-hand side and transferring them by clicking on . For this example, select **Mischievous Acts**. It is also possible to select a factor (or grouping variable) by which to split the output (so if you select **Cloak of invisibility** and transfer it to the box labelled *Factor List*, SPSS will produce exploratory analysis for each group – a bit like the *split file* command). If you click on Statistics... a dialog box appears, but the default option is fine (it will produce means, standard deviations and so on). If you click on Plots... and select the option Normality plots with tests, you will also get the Kolmogorov–Smirnov test and some normal Q-Q plots in your output. Click on Continue to return to the main dialog box and click on OK to run the analysis.



SELF-TEST To prove that I'm not making it up as I go along, run a regression on the data in **Invisibility.sav** with **Cloak** as the predictor and **Mischief** as the outcome. **Cloak** is coded using zeros and ones as for the dummy variable described above.

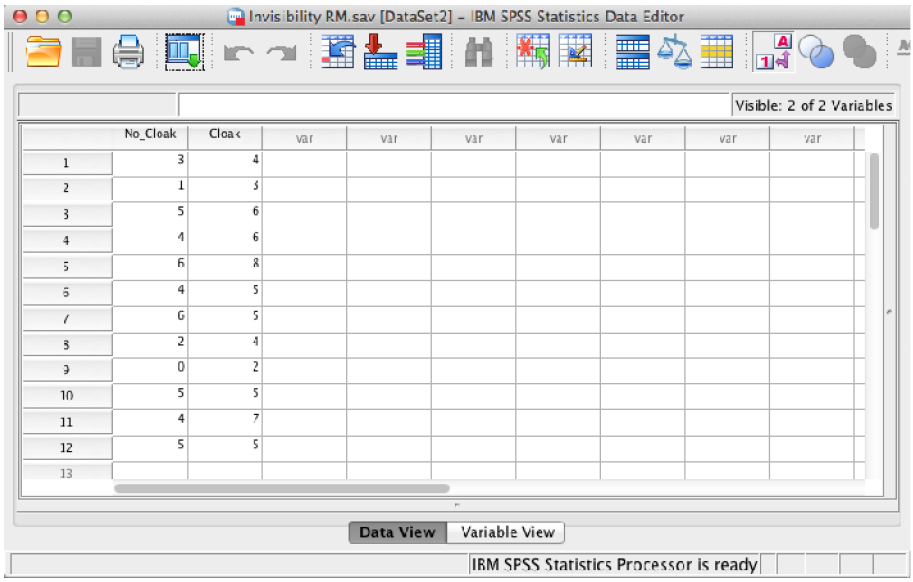


SELF-TEST Produce an error bar chart of the **Invisibility.sav** data (**Cloak** will be on the *x*-axis and **Mischief** on the *y*-axis).



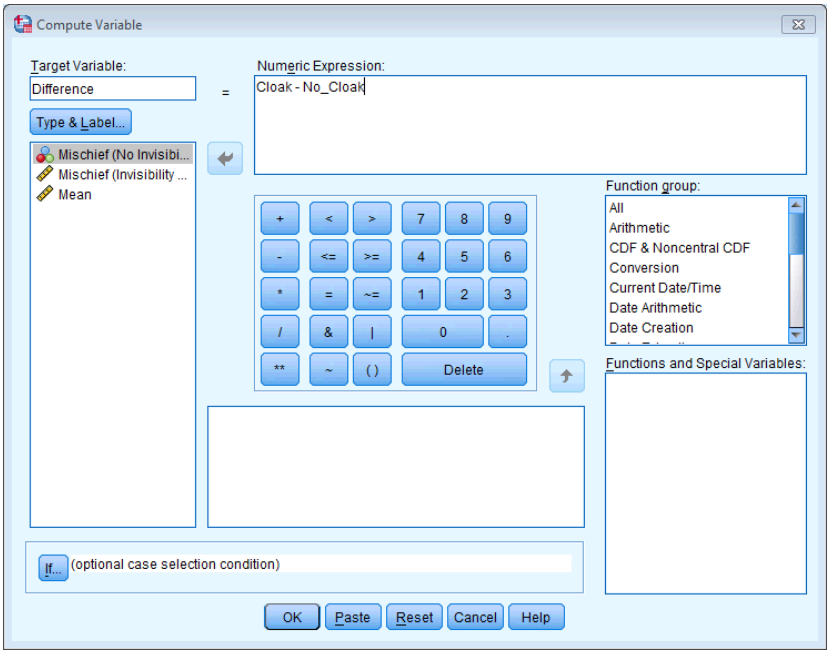
SELF-TEST Enter the data in Table 9.1 into SPSS, but assuming that a repeated-measures design was used.

If the data had been collected as a repeated-measures design, then we would enter the cloak and no cloak conditions in different columns as shown below.

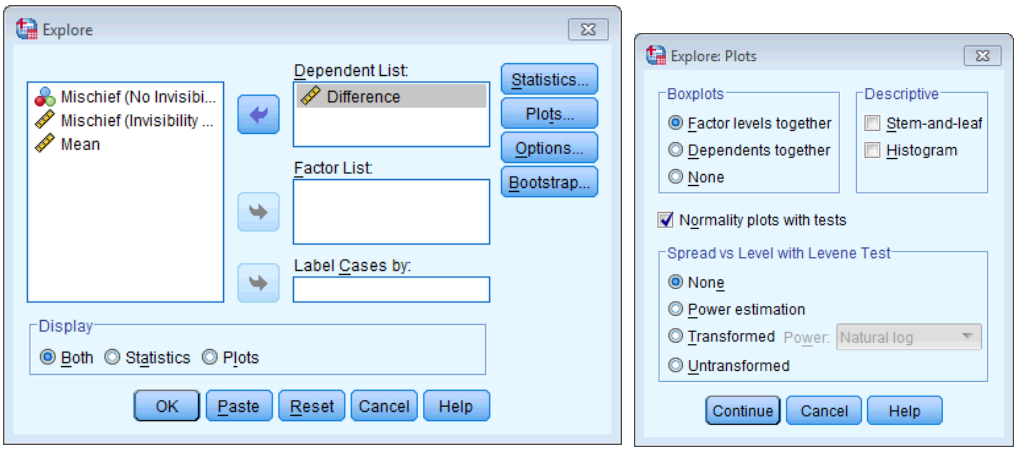


SELF-TEST Using the **Invisibility RM.sav** data, compute the differences between the cloak and no cloak conditions and check the assumption of normality for these differences.

First compute the differences using the *compute* function:



Next, use Analyze Descriptive Statistics Explore... to get some plots and the Kolmogorov–Smirnov test:



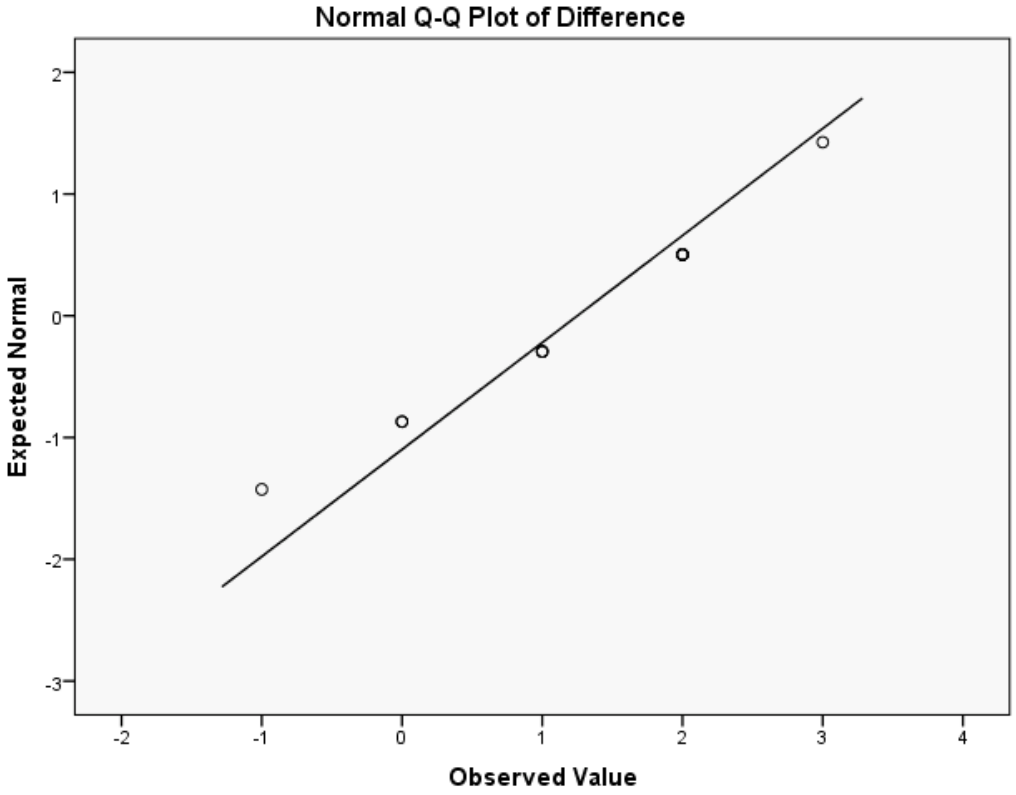
The Tests of Normality table below shows that the distribution of differences is borderline significantly different from normal, $D(12) = 0.25$, $p = .045$. However, the Q–Q plot shows that the quantiles fall pretty much on the diagonal line (indicating normality). As such, it

looks as though we can assume that our differences are fairly normal and that, therefore, the sampling distribution of these differences is normal too. Happy days!

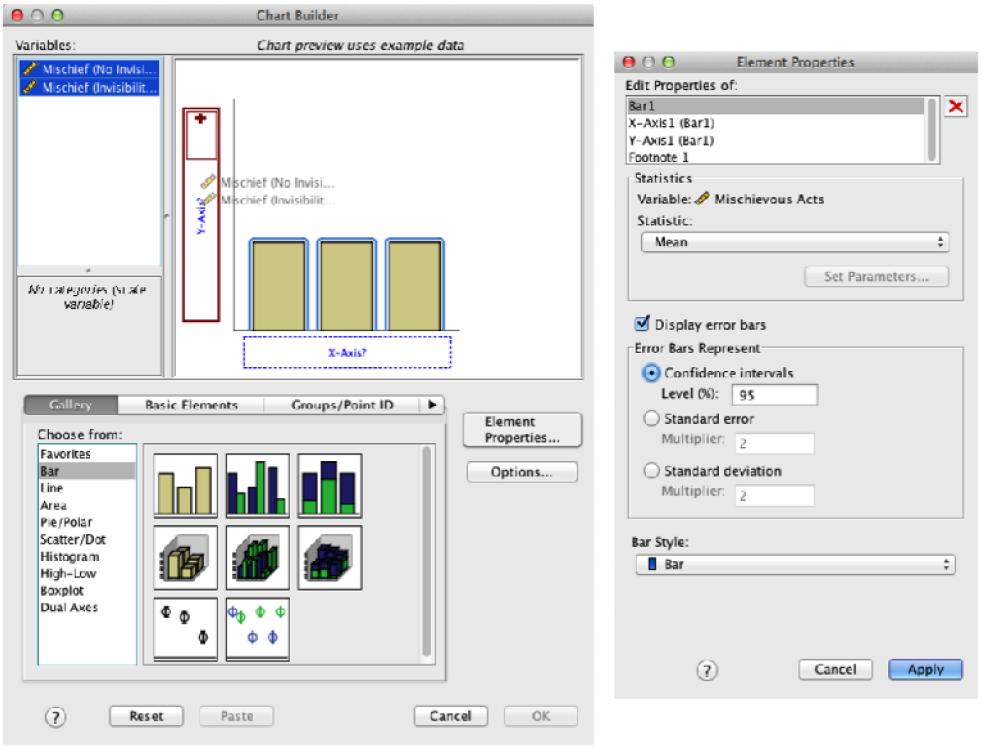
Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Difference	.245	12	.045	.912	12	.228

a. Lilliefors Significance Correction



SELF-TEST Produce an error bar chart of the **Invisibility RM.sav** data (**Cloak** on the *x*-axis and **Mischief** on the *y*-axis).



SELF-TEST Create an error bar chart of the mean of the adjusted values that you have just made (**Cloak_Adjusted** and **No_Cloak_Adjusted**).

The completed graph editor window should look like the screenshot below.