Instructions for carrying out statistical procedures and tests using SPSS

These instructions are closely linked to the author's book:

Essential Statistics for the Pharmaceutical Sciences
John Wiley & Sons Ltd **http://eu.wiley.com**
2007
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For all references to chapters or tables, see the above book.

Using SPSS to perform a two-sample t-test

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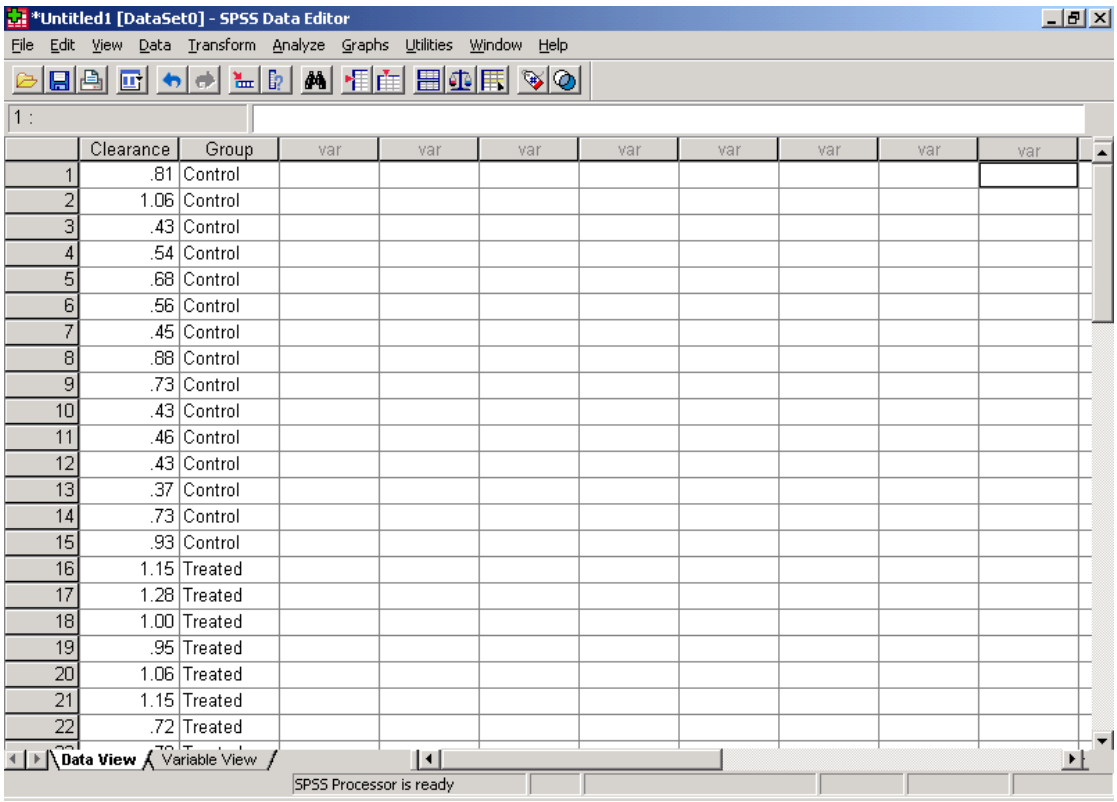
Example: Table 6.1 Clearance of theophylline (ml/min/kg) for control subjects and for those pre-treated with rifampicin.

Label column 1 as ' Clearance' and set it up to take numeric data. Enter the control clearances into the first 15 rows and the treated values into rows 16-30.

Label column 2 as 'Group' and set it up as String (7 characters). Enter 'Control' in the first 15 rows and 'Treated' in rows 16-30.

The Worksheet should then appear as in Fig 1:

Fig 1 Data Editor laid out for a 2-sample t-test.



Follow the menus

Analyze / Compare Means / Independent-Samples T Test …

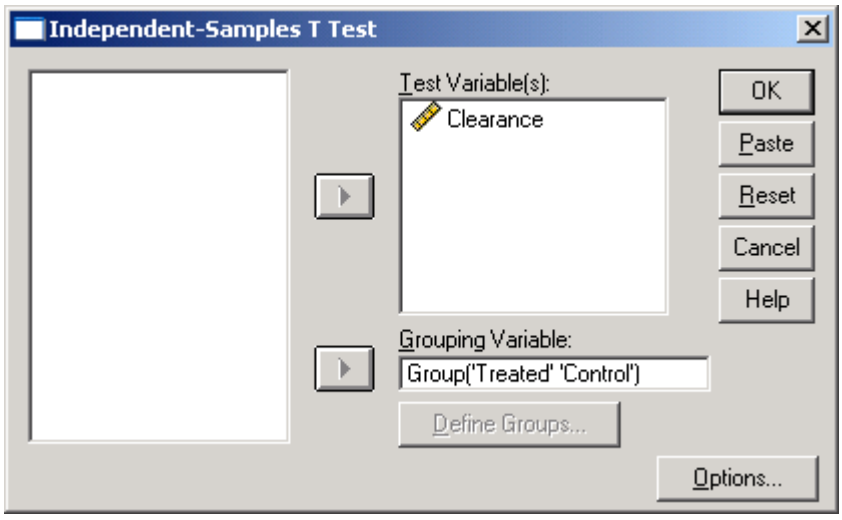
Move 'Clearance' into the 'Test Variable(s)' box and 'Group' into the 'Grouping Variable' box.

Click the 'Define Groups …' button and enter 'Treated' in the 'Group 1' box and 'Control' in the 'Group 2' box. Notice that by defining Groups 1 & 2 as we have, the calculated difference in clearance will be a positive figure. Since the active treatment caused an increase in clearance, this is appropriate. Had we

entered the labels the other way round, the effect of active treatment would be registered as a negative change, which can be confusing! Click ‘Continue’.

The ‘Independent-Samples T Test’ window should now appear as in Fig 2:

Fig 2: Completed Independent-Samples T Test window



Clicking OK should produce the output shown on the next page:

Group Statistics

	Group	N	Mean	Std. Deviation	Std. Error Mean
Clearance	Treated	15	.9313	.20213	.05219
	Control	15	.6327	.21615	.05581

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
Clearance	Equal variances assumed	.168	.685	3.909	28	.001	.29867	.07641	.14215	.45518
	Equal variances not assumed			3.909	27.875	.001	.29867	.07641	.14212	.45522

The first table provides basic descriptive statistics (Mean SD, SEM) for both groups.

In Section 6.5.1 of the book, it was explained that the classical t-test assumes that the two samples are from populations with equal SDs, but that there is a variant test (Welch's approximate t) which does not make this assumption. The second table has two rows of output, one labelled 'Equal variances assumed' and the other 'Equal variances not assumed'. Therefore, the upper figures correspond to the classic test and the lower to the Welch version. The rest of this document will assume that a classic test was required.

In the column headed 'Sig. (2-tailed)' there is a P value (Yellow) of 0.001 (Statistically significant.)

The point estimate for the difference in clearance between the two groups is then given as 0.29867 ml/min/kg (Blue).

Finally, there are lower and upper limits for a 95% C.I. for the difference. The interval is 0.14215 to 0.45518 ml/min/kg (Grey). As this interval excludes zero, statistical significance is confirmed.