

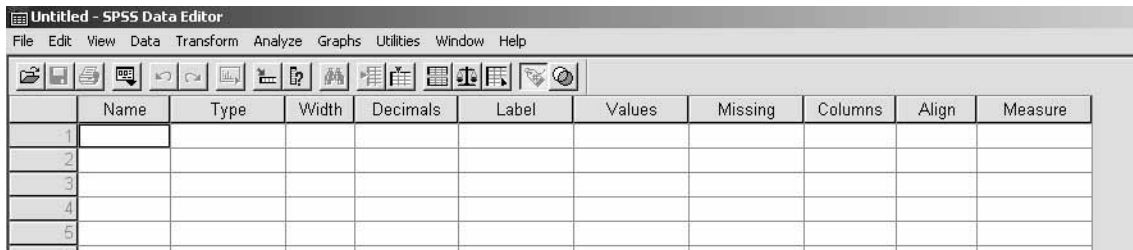
7.3. z and t tests for matched data

EXAMPLE 7.3. Weight loss by members of a fencing club during a 1-day competition

BOX 7.4. How to carry out a z and t test for matched data

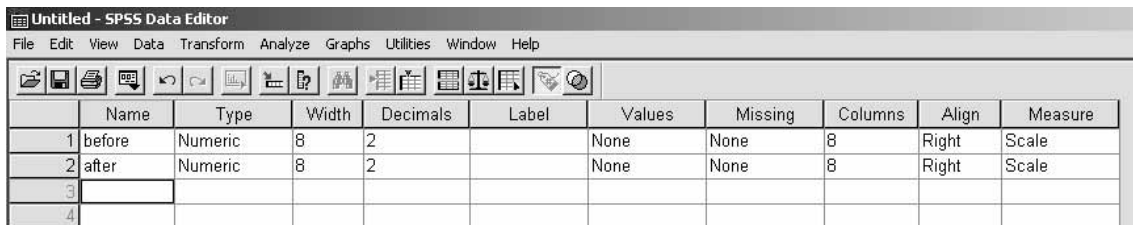
Step 1. Set up the variables.

When SPSS starts up, select ‘Variable View’ using the tabs at the bottom left. You should get something like this:



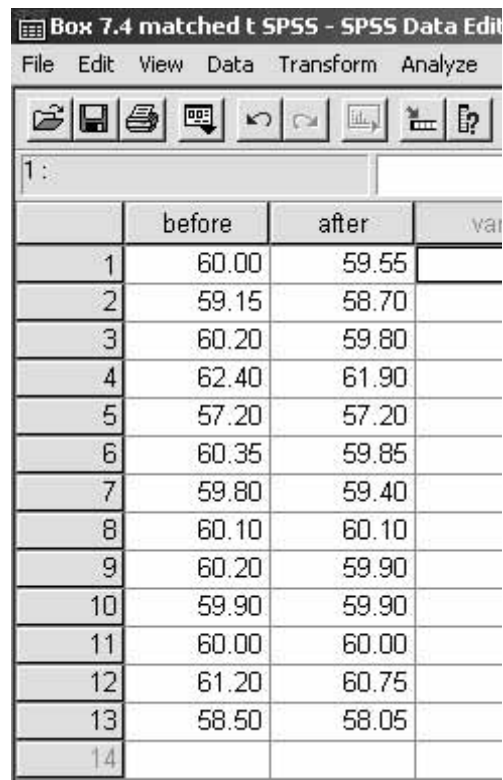
	Name	Type	Width	Decimals	Label	Values	Missing	Columns	Align	Measure
1										
2										
3										
4										
5										

For the first variable name, type in ‘before’, and for the second ‘after’. Default properties are set for each variable.



	Name	Type	Width	Decimals	Label	Values	Missing	Columns	Align	Measure
1	before	Numeric	8	2		None	None	8	Right	Scale
2	after	Numeric	8	2		None	None	8	Right	Scale
3										
4										

The weights are measured to two decimal places of kg, so the default decimals setting of ‘2’ is OK in both cases. Transfer to ‘Data View’ using the tabs at the bottom left, and enter the data.



The image shows a screenshot of the SPSS Data Editor window titled "Box 7.4 matched t SPSS - SPSS Data Editor". The window displays a dataset with 14 rows and 4 columns. The columns are labeled "before", "after", and "var". The data values are as follows:

	before	after	var
1	60.00	59.55	
2	59.15	58.70	
3	60.20	59.80	
4	62.40	61.90	
5	57.20	57.20	
6	60.35	59.85	
7	59.80	59.40	
8	60.10	60.10	
9	60.20	59.90	
10	59.90	59.90	
11	60.00	60.00	
12	61.20	60.75	
13	58.50	58.05	
14			

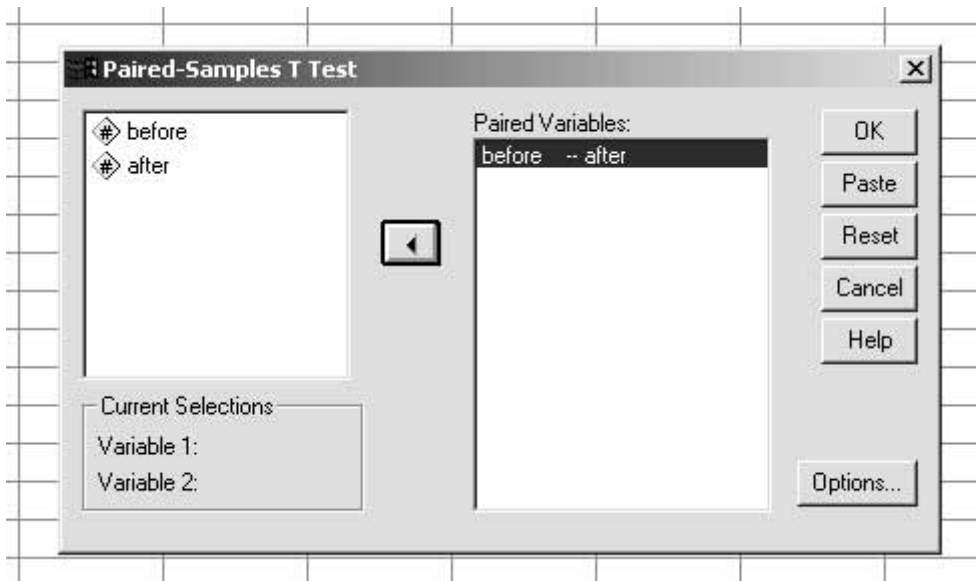
Step 2. Perform the test.

Go to 'Analyze', 'Compare Means', 'Paired-Samples T Test'.

The screenshot shows the SPSS Data Editor window titled "Box 7.4 matched t SPSS - SPSS Data Editor". The menu bar includes File, Edit, View, Data, Transform, Analyze, Graphs, Utilities, Window, and Help. The Analyze menu is open, showing a list of statistical tests. The "Compare Means" option is selected, which has opened a sub-menu. In this sub-menu, "Paired-Samples T Test..." is highlighted. The background data table has two columns, "before" and "after", with 14 rows of data.

	before	after
1	60.00	59.5
2	59.15	58.7
3	60.20	59.8
4	62.40	61.9
5	57.20	57.2
6	60.35	59.8
7	59.80	59.4
8	60.10	60.1
9	60.20	59.5
10	59.90	59.90
11	60.00	60.00
12	61.20	60.75
13	58.50	58.05
14		

Click on 'Before', and it will become 'variable 1' of the pair. Click on 'After', and it will become 'variable 2'. Click on the arrow to transfer the pair to the 'Paired Variables' window.



Click on 'OK'. The output will appear in a separate window.

Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	BEFORE	59.9231	13	1.23147	.34155
	AFTER	59.6231	13	1.16594	.32337

Paired Samples Correlations

		N	Correlation	Sig.
Pair 1	BEFORE & AFTER	13	.986	.000

Paired Samples Test

		Paired Differences				t	df	Sig. (2-tailed)	
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower				Upper
Pair 1	BEFORE - AFTER	.3000	.21409	.05938	.1706	.4294	5.052	12	.000

Step 3. Decide what the result means.

In the last table of the output, the value of t is given as 5.052. The column headed ‘Sig. (2-tailed)’ gives the p value for this test, which is less than 0.001. We therefore conclude that there is a very highly significant difference ($t = 5.053$, $p = 0.001$) between the mean weights (kg) of individuals before and after a fencing competition.