SPSS Chapter 7 Example 3 - Independent-Samples t Test

A teacher believes that directed reading activities in the classroom will lead to improved reading ability among elementary school students. To test this hypothesis, 21 students who participated in these activities for eight weeks were compared with 23 students who did not receive directed reading activities. Students in both groups completed a Degree of Reading Power (DRP) test.
The data are presented here in a table:

Treatment Group				Control Group			
24	61	59	46	42	33	46	37
43	44	52	43	43	41	10	42
58	67	62	57	55	19	17	55
71	49	54		26	54	60	28
43	53	57		62	20	53	48
49	56	33		37	85	42	

We are testing the following:
H_0: $\mu_1 = \mu_2$
H_a: $\mu_1 > \mu_2$
The data are entered in SPSS and look like the following:

File   Edit   View   Data   Transform   Statistics   Graphs   Utilities   Window   Help

1:group   1

	group	drpscore	var	var	var	var
1	1	42				
2	1	43				
3	1	55				
4	1	26				
5	1	62				
6	1	37				
7	1	33				
8	1	41				
9	1	19				
10	1	54				
11	1	20				
12	1	85				

SPSS Processor is ready

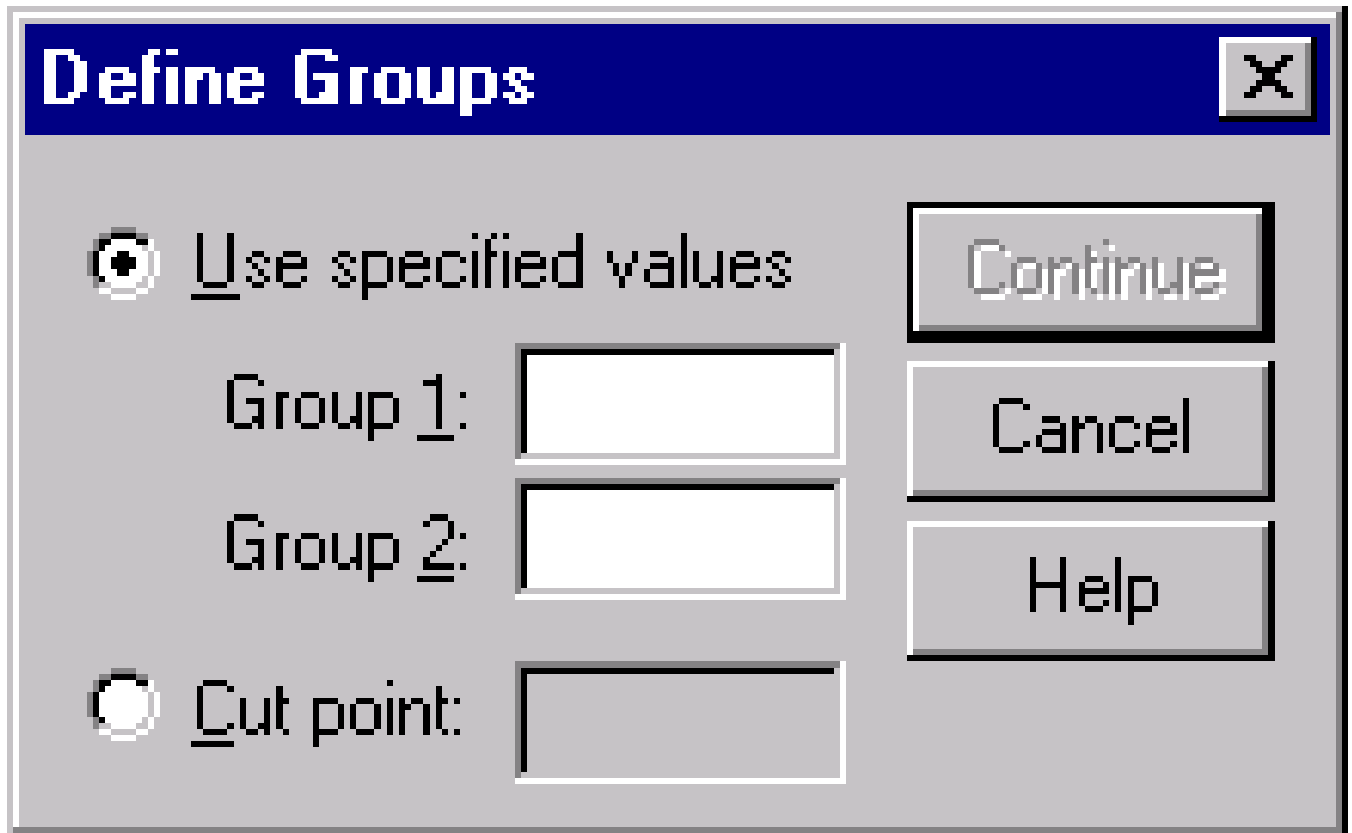Dr. Robert Gebotys   2006

Follow these steps to perform this inferential statistic:

1. Click **Analyze**, click **Compare Means**, and click **Independent-Samples t Test**. The following window will appear.
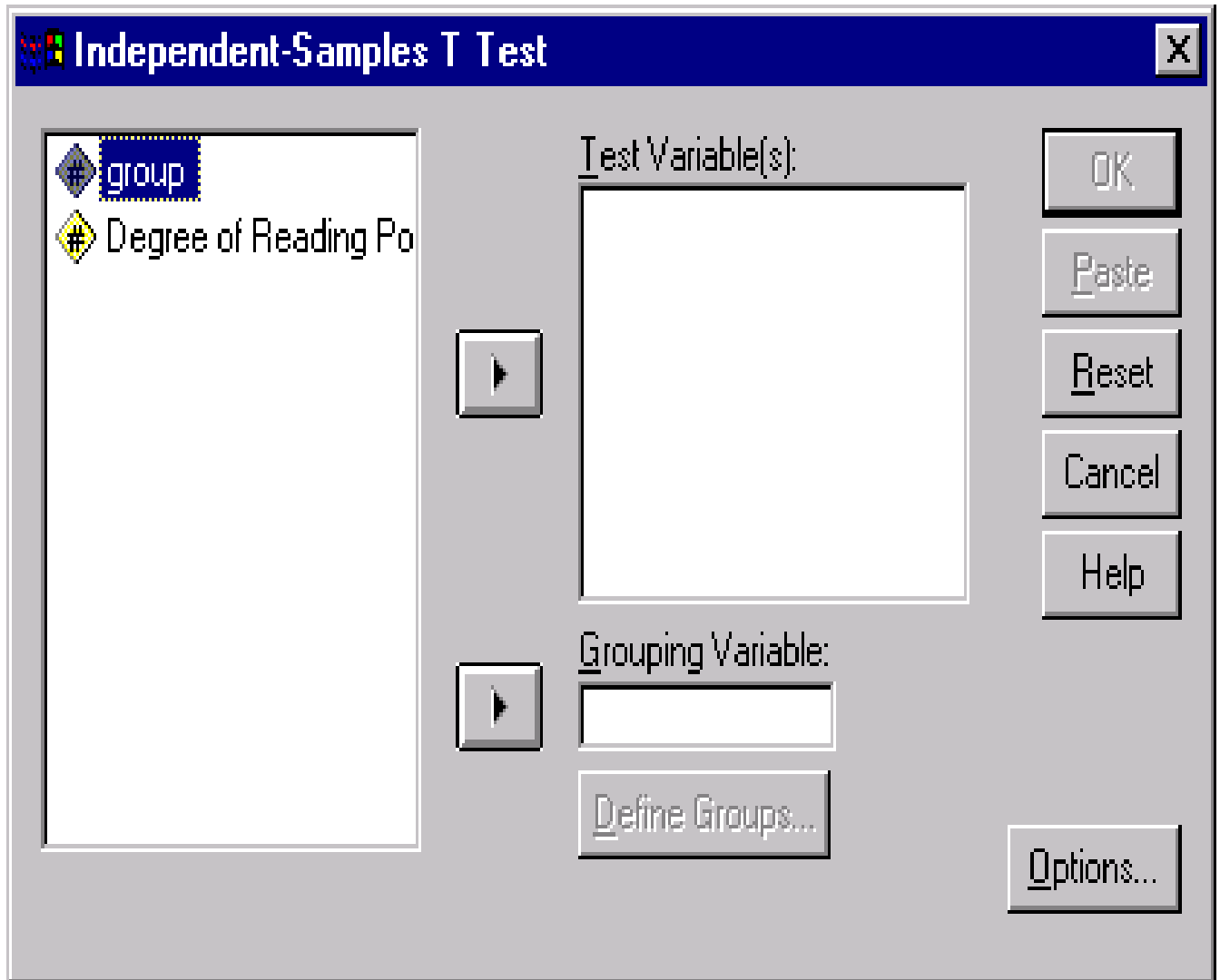
2. Click "**drpscore**" (a.k.a. "Degree of Reading Power score") and click ▸ to move "**drpscore**" into the box entitled *Test Variable(s)*.

3. Click "**group**", click ▸ to move "**group**" into the box entitled *Grouping Variable*.

4. Click **Define Groups** and the following window will appear.

Define Groups

◉ <u>U</u>se specified values

Group <u>1</u>: [   ]

Group <u>2</u>: [   ]

○ <u>C</u>ut point: [   ]

[Continue]

[Cancel]

[Help]

5. Type "**1**" in the *Group 1* box. (Note: the groups were previously defined in the SPSS Data Editor. Specifically, "1" is the label for the control group and "2" is the label for the treatment group). Type "**2**" in the *Group 2* box and click **Continue**.

6. A 95% confidence interval is the default for the Independent-Samples t Test. If you wish to change the confidence level, click **Options**, change "**95**" to the desired confidence level in the box entitled *Confidence Interval*, and click **Continue**.

7. Click **OK**.

The SPSS output for this example of the Independent-Samples t Test is the following:

The sample size for each group is 23 and 21, respectively. The means and standard deviations are listed below.

Group Statistics

	GROUP	N	Mean	Std. Deviation	Std. Error Mean
Degree of Reading Power Score	Control	23	41.52	17.15	3.58
	Treatment	21	51.48	11.01	2.40

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
Degree of Reading Power Score	Equal variances assumed	2.362	.132	-2.267	42	.029	-9.95	4.39	-18.82	-1.09
	Equal variances not assumed			-2.311	37.85	.026	-9.95	4.31	-18.68	-1.23

The test of H_0: $\mu_1 = \mu_2$ vs H_a: $\mu_1 > \mu_2$ is tested using a t test. The t-value is –2.311 with 37.855 degrees of freedom with a p-value of .026. Note that this p-value Is for a two sided test we therefor divide .026/2=.013 and obtain the one sided p-value of .013. Equal variances are not assumed and we have strong evidence against H_0.