UJI BEDA
(t Test for Independent & Paired Groups)

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RULES

1. PJ mata kuliah wajib mempersiapkan perlengkapan sebelum proses pembelajaran

2. Membawa Laptop (optional)

3. Terpasang Software SPSS

4. Terkoneksi Internet

5. Mengumpulkan *hasil praktik* selesai perkuliahan di SIP

Paired-Samples t Test

The paired-samples t test is used in repeated measures or correlated groups design, in which each subject is tested twice on the same variable. A common experiment of this type involves the before and after design.

The test can also be used for the matched group design in which pairs of subjects that are matched on one or more characteristics (e.g., IQ, grades, and so forth) serve in the two conditions. As the subjects in the groups are matched and not independently assigned, this design is also referred to as a correlated groups design

Checklist of Requirements

In any one analysis, there must be only two sets of data.
The two sets of data must be obtained from (1) the same subjects, or (2) from two matched groups of subjects.

Assumption

The sampling distribution of the means should be normal.

CASE

A researcher designed an experiment to test the effect of drug X on eating behavior. The amount of food eaten by a group of rats in a one-week period, prior to ingesting drug X, was recorded. The rats were then given drug X, and the amount of food eaten in a one-week period was again recorded. The following amounts of food in grams were eaten during the "before" and "after" conditions.

	Food Eaten	
	Before Ingesting Drug X	**After Ingesting Drug X**
s1	100	60
s2	180	80
s3	160	110
s4	220	140
s5	140	100
s6	250	200
s7	170	100
s8	220	180
s9	120	140
s10	210	130

Data Entry Format

| Variables	Column	Code
• BEFORE	• 1	• Food eaten in grams
• AFTER	• 2	• Food eaten in grams

Testing Assumption

1. From the menu bar, click **Analyze**, then **Descriptive Statistics**, and then **Explore....** The following **Explore** window will open.

2. Transfer the **BEFORE** and **AFTER** variables to the **Dependent List:** field by clicking these variables (highlight) and then clicking ⮕.
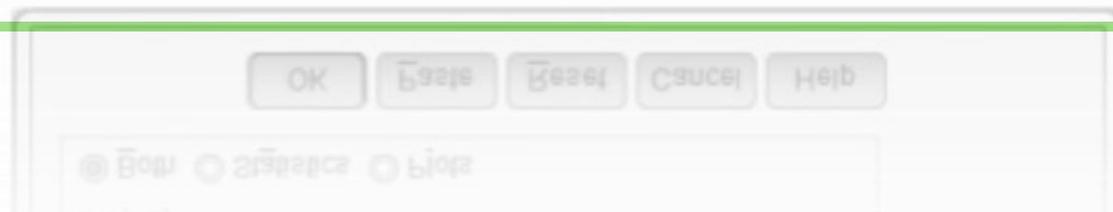
3. Click [Statistics...] to open the **Explore: Statistics** window. Check the **D**escriptives field and click [Continue] to return to the **Explore** window.
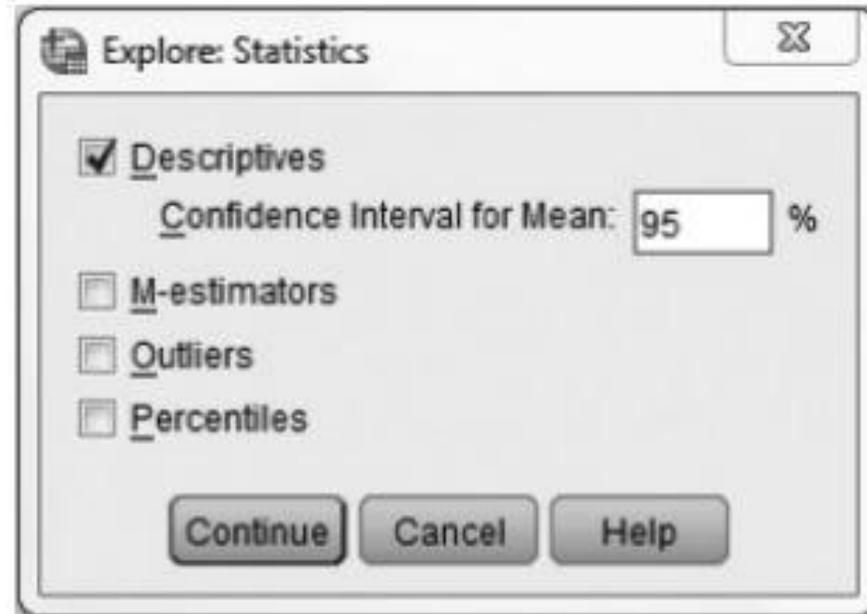
4. In the **Explore** window click [Plots...] to open the **Explore: Plots** window. Check the **Normality plots with tests** field.


Click [Plots...] to return to the **Explore** window.

# SPSS Output

Normal Q-Q Plot of Before
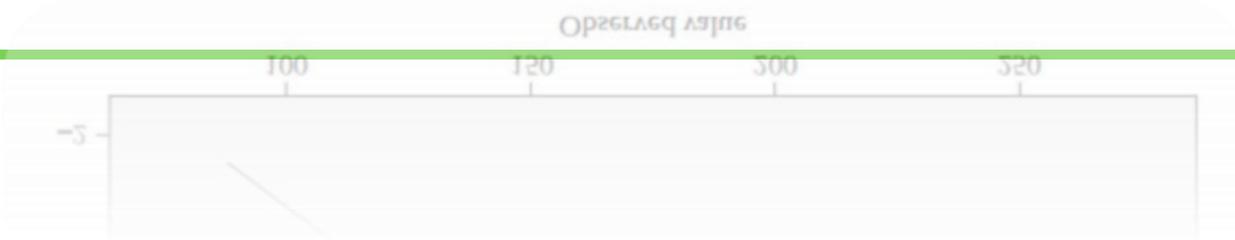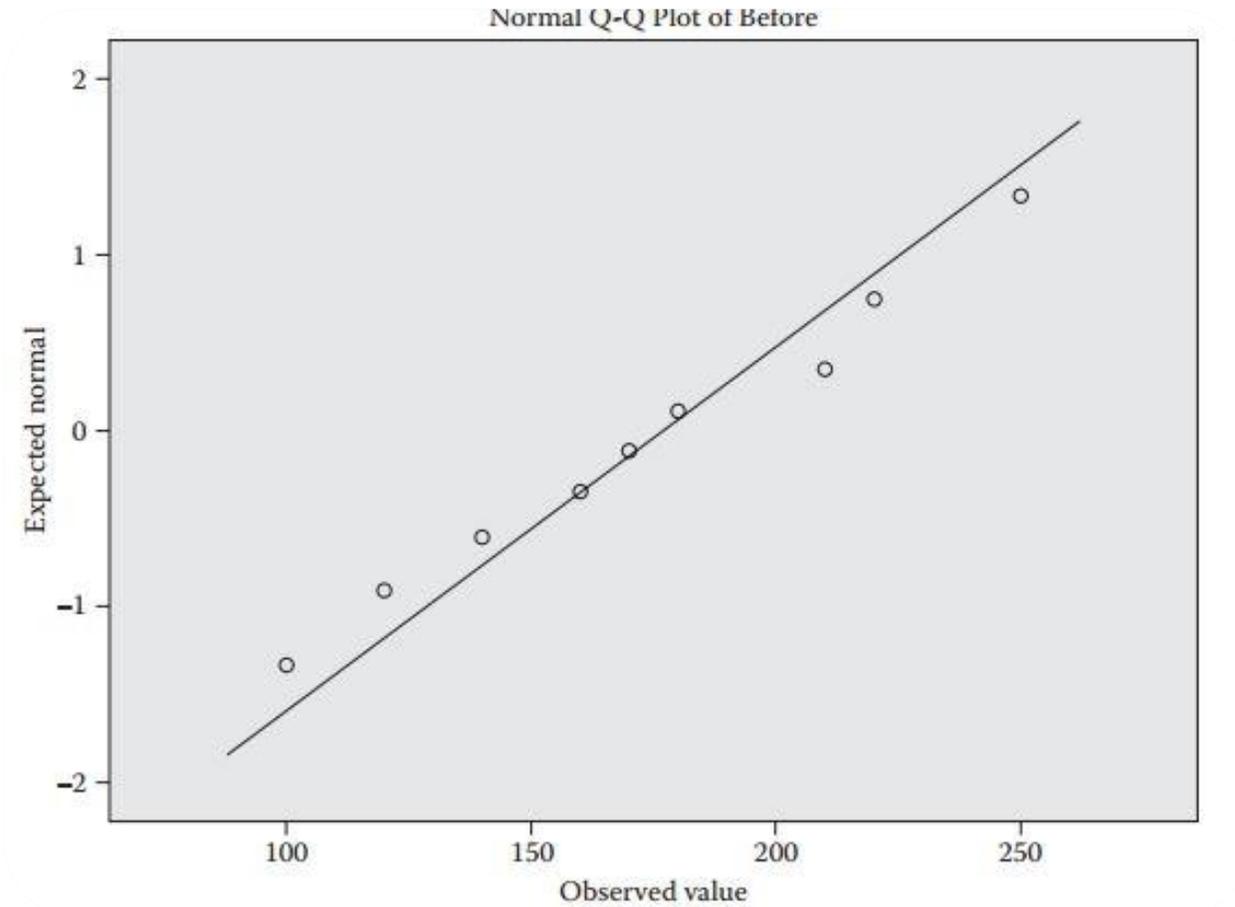
Another diagnostic test for normality is a visual check of the **Normal Q–Q Plot** that compares the cumulative distribution of the observed values with the expected values derived from the normal distribution. The normal distribution forms a straight diagonal line, and if a variable's distribution is normal, the data distribution will fall more or less on the diagonal.

Inspection of the normal Q–Q plots shows very little departure from normality for both the **BEFORE** and **AFTER** variables.

Similarly, a visual check of the **Detrended Normal Q–Q Plot**, which plots the deviations of the scores from a straight line, shows little deviation from normality for both the **BEFORE** and **AFTER** variables.

Windows Method: Paired-Samples t Test

From the menu bar, click **Analyze**, then **Compare Means**, and then **Paired-Samples *t* Test.** The following window will open.
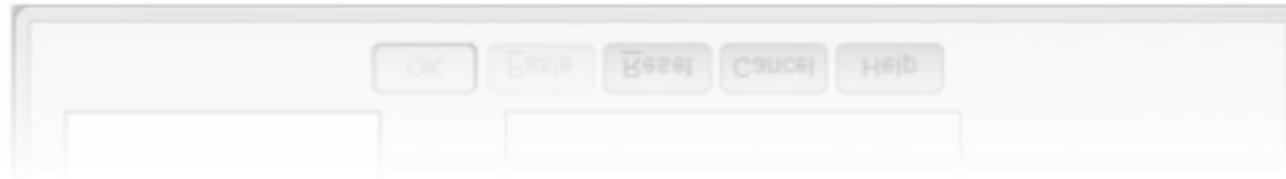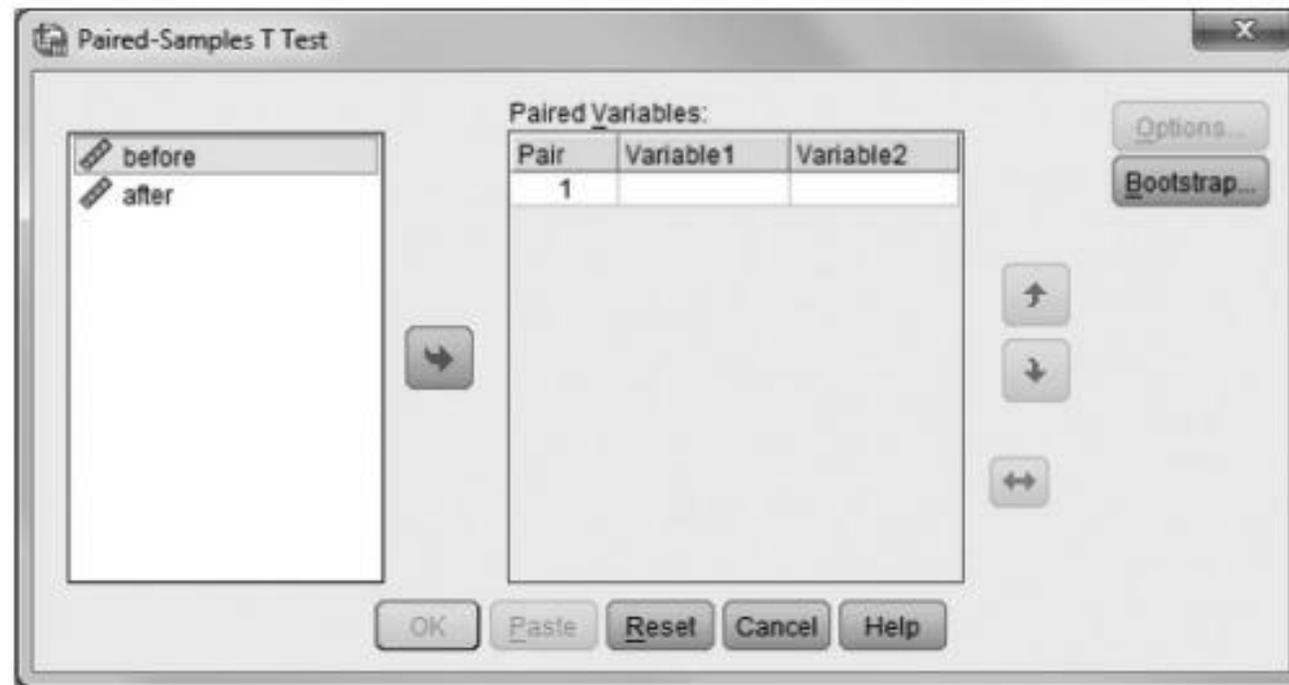
2. Transfer both the **BEFORE** and **AFTER** variables to the **Paired Variables:** field by clicking (highlight) these two variables, and then clicking ➡. Click [OK] to run the *t* Test analysis. See Table 5.2 for the results.
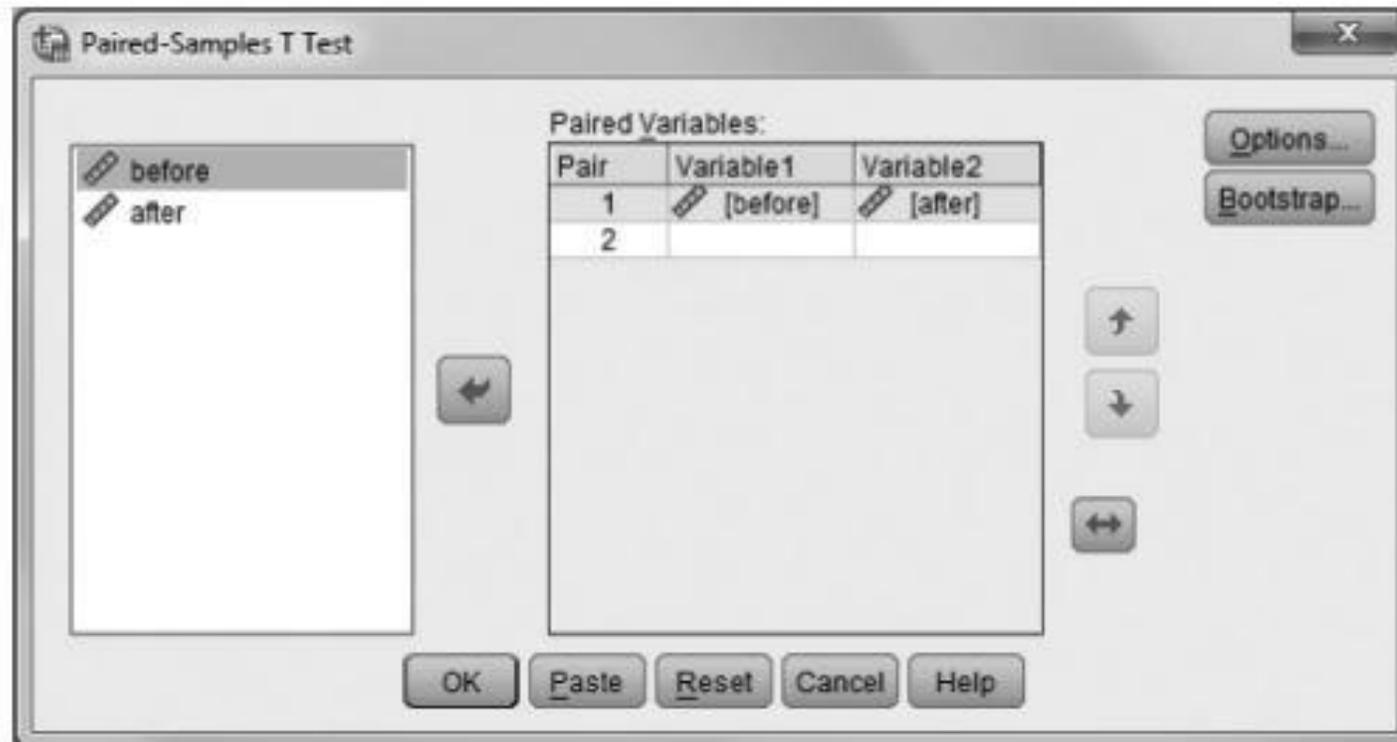
SPSS Output

Paired-Samples *t* Test Output

Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Before	177.0000	10	48.31609	15.27889
	After	124.0000	10	43.25634	13.67886

Paired Samples Correlations

		N	Correlation	Sig.
Pair 1	Before and After	10	0.745	0.013

Paired Samples Test

| | | Paired Differences | | | | | | | |
| | | | | | 95% Confidence Interval of the Difference | | | | Sig. |
		Mean	Std. Deviation	Std. Error Mean	Lower	Upper	t	df	(2-tailed)
Pair 1	before - after	53.00000	33.01515	10.44031	29.38239	76.61761	5.076	9	.001

Results and Interpretation

The result from the analysis indicates that there is a signifcant difference in the amount of food eaten before and after drug X was ingested, $t(df = 9) = 5.08$, $p < .01$ (see **Paired Samples Test** table).

The mean values indicate that signifcantly less food was consumed after ingestion of drug X ($M = 124.00$) than before ($M = 177.00$)

REFLEKSI

1. Informasi penting hari ini

2. Manfaat penting dari informasi penting hari ini

3. Tindak lanjut yang dapat saudara lakukan

Thank You