

جامعة امحمد بوقرة بومرداس
كلية العلوم الاقتصادية، التجارية وعلوم التسيير
يوم دراسي حول منهجية البحث العلمي وتحليل البيانات باستخدام SPSS
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Methodology of Using Statistical Tests (SPSS Package)

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Data and variables

DATA: the answers to questions or measurements from the experiment

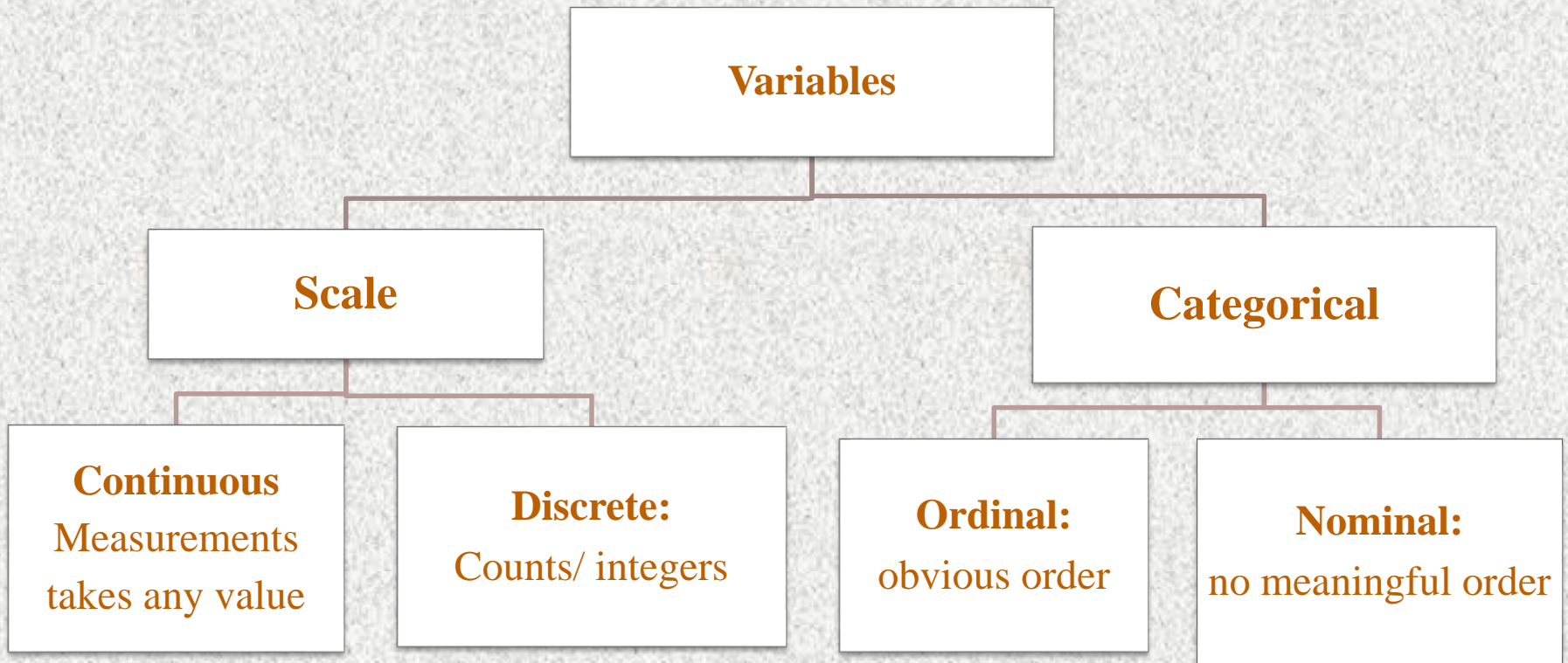
One variable per column

VARIABLE = measurement which varies between subjects e.g. height or gender

One row per subject

	A	B	C	D
	Subject ID	Gender	Year of study	Height
1	1	Male	1	170
2	2	Female	2	160
3	3	Female	3	165
4	4	Male	PG	175
5	5	Female	3	168

Data types



Populations and samples

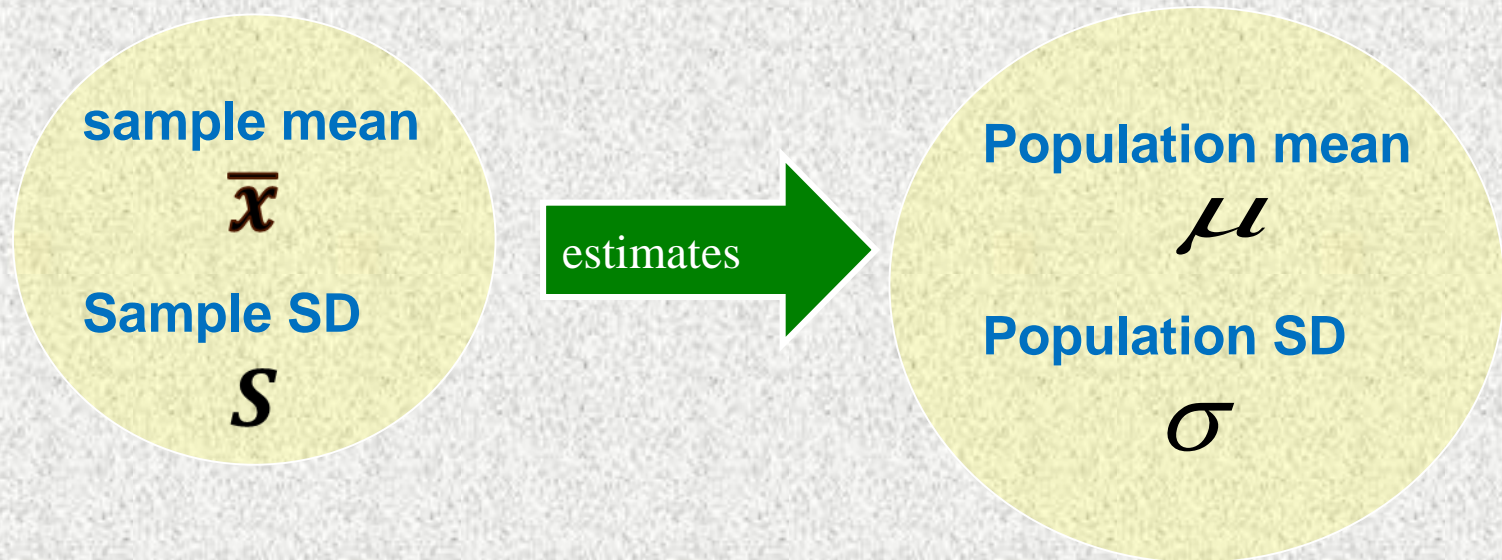
Taking a sample from a population



Sample data 'represents' the whole population

Point estimation

- **Sample data is used to estimate parameters of a population**
- **Statistics** are calculated using sample data.
- **Parameters** are the characteristics of population data



Hypothesis

To make an investigation about the reality, the questions should be expressed in terms of measurable HYPOTHESIS



Hypothesis

In which the hypothesized relationships is described as positive, negative, more than, or less than.

H1. There is a positive significant relationship

H2. There is a positive significant relationship

H3. There is a positive significant relationship

H4. The perceived benefit has Mediation effect on the relationship.

H5. The perceived benefit moderate the relationship.

Questionnaires and Management Research

- ❖ Much of the data in management and social science research is gathered using questionnaires or interviews.
- ❖ The validity of the results depends on the quality of these instruments.

Remember!!!!

- The Quality of the data is dependent on the instrument through which the data were gathered.



Steps to undertaking a Hypothesis test

Define study question



Set null and alternative hypothesis



Calculate a test statistic



Calculate a p-value



Make a decision and interpret
your conclusions

Parametric versus Nonparametric tests – When to use them and which is more powerful?



- The observations must be independent (For example participants need to have completed the dependent variable separately, not in groups).
- The observations must be drawn from normally distributed populations
- These populations must have the same variances

- **parametric test**, of course, is a test that **requires a parametric assumption**, such as normality
- **A nonparametric test does not rely on parametric assumptions** like normality.
- The two sample t-test requires three assumptions, normality, equal variances, and independence. The non-parametric alternative, the Mann-Whitney-Wilcoxon test, does not rely on the normality assumption,

Normality Test

There are several different tests that can be used to test the following hypotheses:

H_0 : The distribution is normal

H_A : The distribution is NOT normal

Common tests of normality include:

Shapiro-Wilk

Kolmogorov-Smirnov

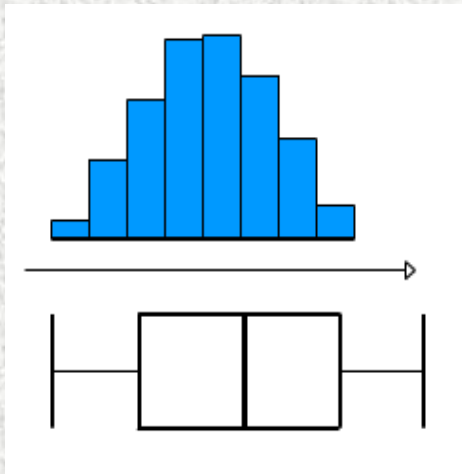
Anderson-Darling

Lillefor's

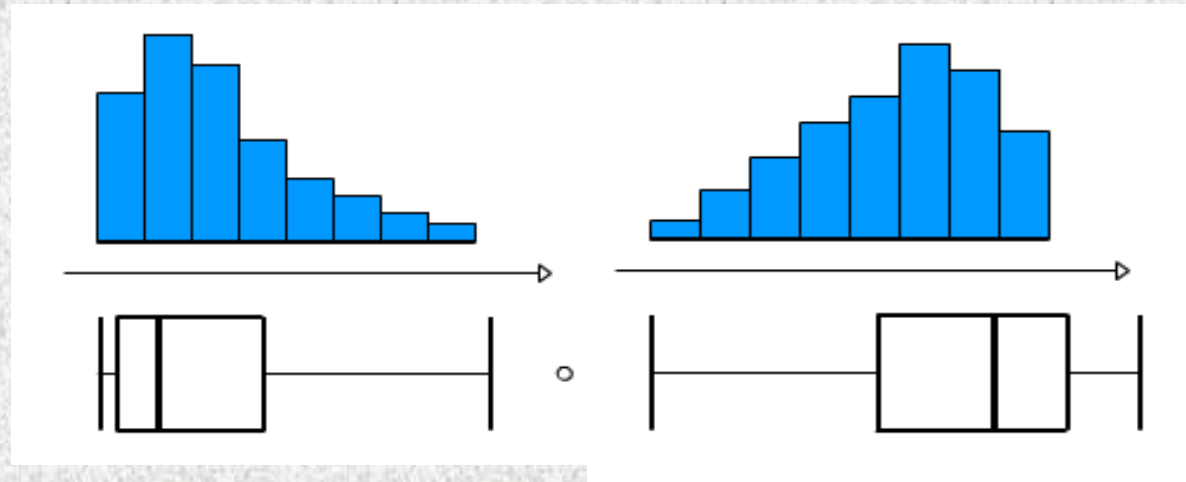
Tools for Assessing Normality

- Histogram and Boxplot
- Normal Quantile Plot
(also called Normal Probability Plot)

Normally
distributed



Or....Skewed



The mean and median are very
different for skewed data.

Checking normality in SPSS

- The SPSS dataset 'NormS' contains the variables used in this sheet including the exercises.
- To check if a variable is normally distributed use *Analyze* ☐ *Descriptive Statistics* ☐ *Explore*:

The screenshot shows the SPSS interface with the 'Explore' dialog box and the 'Explore: Plots' sub-dialog box open. The 'Explore' dialog has 'Ex1_BMI', 'ex2_before', and 'ex2_after' in the 'Dependent List'. The 'Explore: Plots' dialog has 'Normality plots with tests' checked, and 'Histogram' checked under 'Descriptive'. Annotations with arrows point to the 'Plots...' button, the 'Normality plots with tests' checkbox, the 'Histogram' checkbox, and the 'Factor List' field in the 'Explore' dialog.

Select the Plots... button and the 'Normality plots with tests' and the 'Histogram' options

When carrying out tests comparing groups, e.g. t-tests, normality checks should be carried out separately for each group: put the appropriate grouping variable in the Factor List

Non parametric tests in SPSS

chisquare and binomial.sav [DataSet1] - SPSS Data Editor

File Edit View Data Transform **Analyze** Graphs Utilities Add-ons Window Help

20 :

	Age	Marital_	s
1	21.00		
2	40.00		
3	32.00		
4	37.00		
5	40.00		
6	40.00		
7	52.00		
8	35.00		
9	38.00		
10	55.00		
11	35.00		
12	35.00		
13	55.00		
14	40.00		
15	62.00		
16	40.00		
17	48.00		
18	62.00		

Reports
Descriptive Statistics
Tables
Compare Means
General Linear Model
Generalized Linear Models
Mixed Models
Correlate
Regression
Loglinear
Neural Networks
Classify
Data Reduction
Scale
Nonparametric Tests
Time Series
Survival
Missing Value Analysis...
Multiple Response
Complex Samples
Quality Control
ROC Curve...

Achievement
Market_Orien
tation

83.00	17.00
77.00	18.00
79.00	18.00
80.00	18.00
78.00	18.00
78.00	18.00
79.00	24.00
94.00	24.00
81.00	22.00
78.00	18.00

Chi-Square...
Binomial...
Runs...
1-Sample K-S...
2 Independent Samples...
K Independent Samples...
2 Related Samples...
K Related Samples...

Question		Type of variables		
		Scale	Ordinal	Nominal
Is there is a difference?	1 group	One sample t test	Binomial test	Chi-square test
	2 independent groups	Independent sample t test	Mann-Whitney test	Chi-square test
	2 matched groups	Paired sample t test	Wilcoxon test	McNemar's test
	3+ independent groups	One-way ANOVA	Kruskal-Wallis test	Chi-square test
	3+ matched groups	Repeated Measurements	Friedman test	Cochran Q test



THANK YOU
FOR
YOUR
ATTENTION
ANY QUESTIONS?