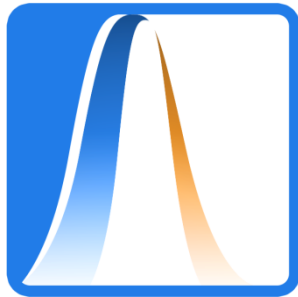
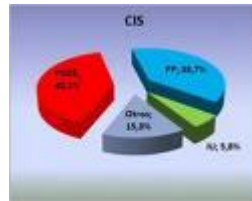


Applied Statistics





Motivation: Uses of statistics



Surveys



Estimation of unemployment ...



Economic predictions



Decision making



Course summary

1. Introduction.
2. Analysis of univariate data.
3. Analysis of bivariate data.
4. Probability and distributions.
5. Introduction to statistical inference.



Bibliography

- Takahishi, S. (2009) *The Manga Guide to Statistics*. Editorial No Starch Press.
- Jauset, J.A. (2007) *Estadística para periodistas, publicitarios y comunicadores*, Editorial UOC, Barcelona
- Remenyi, D. (2010) *An introduction to statistics using Microsoft Excel* , Editorial Academic Publishing.
- Portilla, I. (2004) *Estadística descriptiva para comunicadores* Editorial EUNSA, Pamplona.

There are lots of other books in the library!



Chapter 1: Introduction

1. Concept and use of statistics.
2. Statistical terminology: populations, sub-populations, individuals and samples.
3. Variables.
4. Types of variable.

Recommended reading:

Capítulo 1 del libro de Gonick y Smith (1999).

Capítulo 1 del libro de Peña y Romo (1997).

Capítulo 1 del libro de Portilla (2004).



1.1: Concept and uses of statistics

- a) What is statistics?
- b) Precautions when interpreting statistics.
- c) What are statistics used for?



a: What is statistics?

The OED defines **statistics** as follows:

statistics.

1. (usually treated as sing.) the science of collecting and analyzing numerical data especially in large quantities and usually inferring proportions in a whole from proportions in a representative sample.
2. Any systematic collection or presentation of such facts.



A **statistic** can be any numerical datum.

- Economic statistics: level of unemployment, inflation rate
- Demographic statistics: birth rate, average age
- Sporting statistics: goals scored, red cards
- Weather statistics: temperature, rainfall

A **statistician** is someone like me.



b: Precautions when interpreting statistics

In many cases it is possible to use statistics to influence or mislead the public.



Which one is telling the truth?



Three headlines

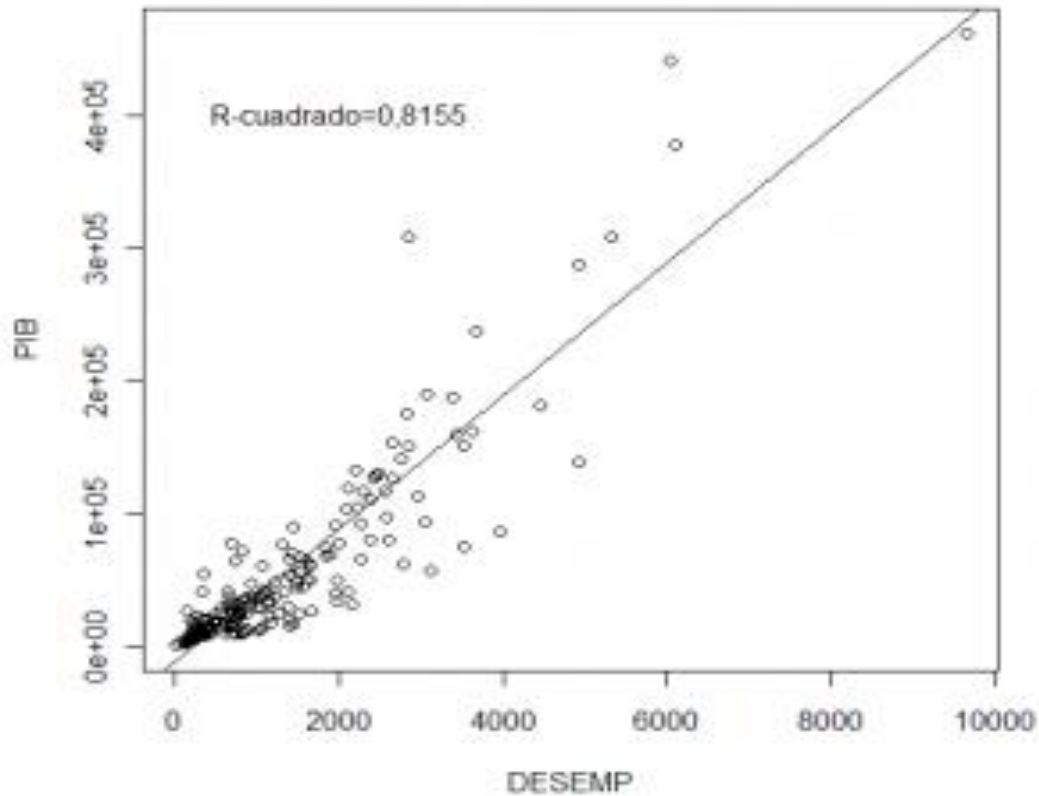
El Mundo, 21 February 2005, after the vote in favour of a referendum of the European Commission by 76% of the voters (32% of the census):
Round victory of the “yes” vote with a low but acceptable participation

El Mundo, 19 June 2006, after the vote in favour of the Catalan Statute by 74% of the voters (36% of the census):
The majority of Catalans aren't interested in the Statute which defines them as a nation

El Mundo, 19 February 2007, after the approval of the Andaluz statute in the referendum by 87,5% of voters (31% of the census):
Only 31% of Andaluces take part in the referendum on their 'national reality'



Data for 187 European regions



More unemployment implies higher GDP?!



c: What are statistics used for?

- **Collection and summary of information.**
- **Illustration of the relation between different variables.**
- **Changes in a variable over time.**
- **Estimation of the characteristics of a population from sample data.**
- **Forecasting and prediction.**

Descriptive Statistics

Inferential Statistics



1.2: Statistical terminology

POPULATION



SAMPLE



VARIABLE



SUB-
POPULATION



INDIVIDUAL



DATUM





1.3: Variables

A **variable** is a characteristic of the population that it is wished to study.

- Political affiliation of Madrileños: IU, PP, PSOE, UPD, others.
- The employment status of Getafenses: unemployed, part time, full time.
- Number of newspapers bought by Madrileños.
- Spending of Spanish town halls.

Different types of variables need different treatments.



1.4: Types of variables

A **qualitative variable** or **attribute** is a non numerical characteristic of the population which it is wished to study.

A **quantitative variable** is a variable that can be measured and evaluated numerically.

- **Political affiliation of Madrileños: IU, PP, PSOE, UPD, others.**
- **The employment status of Getafenses: unemployed, part time, full time.**
- **Number of newspapers bought by Madrileños.**
- **Spending of Spanish town halls.**



Qualitative variables or attributes

Qualitative variables can be **nominal** or **ordinal**.

- **Political affiliation of Madrileños: IU, PP, PSOE, UPD, others.**
- **The employment status of Getafenses: unemployed, part time, full time.**



Quantitative variables

Quantitative variables can be **discrete** or **continuous** (or **mixed**)

- **Number of newspapers bought by Madrileños.**
- **Spending of Spanish town halls.**

- **Time spent waiting before entering a court.**



Exercise

Classify the following variables:

- Town where a person is registered (*empadronado*)
- Total earnings
- Number of points on a driving licence
- Level of agreement with Bologna
- Telephone number
- Level of education
- Postcode



Exercise

What do you think?

La Vanguardia (13/12/2009)

“El 'sí' gana en las consultas soberanistas con el 94,9%”

El recuento final destapó el 3,2% de votos en contra, un 1,6% de votos en blanco y un 0,3% nulos. La Coordinadora calificó la jornada de "heroicidad" por los medios disponibles ...

ABC (13/12/2009)

“Las consultas independentistas pinchan con una participación por debajo del 30%”

Según los datos ofrecidos por los organizadores, en los 166 municipios convocados –con un censo de unas 700.000 personas mayores de 16 años, entre españoles y extranjeros- sólo votaron 200.000, rozando el 30%.



Exercise (Exam question)

In the next municipal elections, we are going to vote for the **party that we want to govern our region**. The variable marked in black is:

- a) quantitative and nominal
- b) qualitative and discrete
- c) qualitative and nominal
- d) qualitative and ordinal



Exercise (Test question)

The following is an excerpt from a questionnaire issued by the Instituto Nacional de Estadística:

- 9.a. ¿Tiene actualmente su hogar pagos pendientes de préstamos hipotecarios o de otro tipo, solicitados para la compra de esta vivienda o para realizar una gran reparación en la misma?
SI ___ NO ___
- 9.b. ¿En qué año le fue concedido el préstamo? (Si ha renovado o renegociado el crédito, esta pregunta y las que siguen a continuación se refieren al crédito actual).
Año _____ |_|_|_|_|_|
- 9.c. (si el año, en la pregunta anterior, es 2007) ¿En qué mes comenzó a pagar el préstamo?
Mes _____ |_|_|
- 9.d. Dígame el importe del último recibo mensual del préstamo, incluyendo amortización e intereses, aunque sea aproximadamente
Importe _____ |_|_|_|_|_|_|_|,|_|_|_|_| €

Classify the variables in questions 9a – 9d as qualitative or quantitative. In the case of quantitative variables, classify them as discrete or continuous.



Exercise (Exam question)

Classify the variables in questions 7 and 9 as qualitative or quantitative. In the case of qualitative variables, classify them as ordinal or nominal.

Individual Questions - Person 1

1 What is your name?
(Person 1 on page 2 - 'Household Members')
◆ Use black or blue ink.
◆ Use CAPITAL LETTERS.
◆ If you make a mistake, fill in the box like this or **ROBERT SMITH**

First name:

Last name:

2 What is your sex?
 Male Female

3 What is your date of birth?
Day Month Year

4 On the 13 May 2007, what is your legal marital or same-sex civil partnership status?
 Never married and never formed a civil partnership
 Married
 Separated, but still legally married
 Divorced
 Widowed
 In a civil partnership
 Separated, but still legally in a civil partnership
 Formerly in a civil partnership which is now legally dissolved
 Surviving partner from a civil partnership

5 Are you a schoolchild or student in full-time education?
 Yes → Go to **6**
 No → Go to **7**

6 Only answer this question if you have answered 'Yes' to Question 5.
Do you live at the address shown on the front of this questionnaire during the school, college or university term?
 Yes, I live at this address during the school/college/university term → Go to **7**
 No, I live elsewhere during the school/college/university term → Go to **30**

7 What is your country of birth?
 England → Go to **9**
 Wales → Go to **9**
 Scotland → Go to **9**
 Northern Ireland → Go to **9**
 Republic of Ireland
 Elsewhere, write in the current name of the country

8 If you were not born in the United Kingdom, when did you most recently arrive to live here?
◆ Do not count returning from holidays or short visits overseas.
Month Year

9 How is your health in general?
 Very good
 Good
 Fair
 Bad
 Very bad

10 Do you have any of the following long-standing conditions?
◆ Include problems which are due to old age.
◆ Tick all boxes that apply.
 Deafness or severe hearing impairment
 Blindness or severe visual impairment
 A condition that substantially limits one or more basic physical activities such as walking, climbing stairs, lifting or carrying
 A learning difficulty
 A long-standing psychological or emotional condition
 Other, including any long-standing illness
 No, I do not have a long-standing condition

11 Does a long-standing health problem or disability mean you have substantial difficulties doing day-to-day activities?
◆ Include problems which are due to old age.
 Yes No

