Statistical Reasoning

Week 3

Sciences Po - Louis de Charsonville

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Week 3 : Data and Survey designs

Research projects

Data Management

- Definitions
- Principles of Data Management

Research projects

Research Project

By next week :

- Your project partner(s)
- The topic, research question, main hypotheses.
- The data and the dependent variable (which must be quantitative)

Fill the Google form.

Assignment submission

Email the assignment by midnight, Do-File + Word document to :
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Data Management

Definitions

What to do with data ?

Data exploration and management

- An essential step before going further with analysis ;
- Use the Stata commands : `lookfor describe codebok recode rename`

Univariate statistics

- To describe/model the association between 2 variables ;
- `tab fre sum hist`

Bivariate statistics

- To describe / model the association between 2 variables
- Double entry table (cross-tabulation), regression, etc.

Multivariate statistics

- To describe / model the associations between 3 or more variables

What methods for which variables ?

Methods	Qualitative variables	Quantitative variables
Univariate statistics	• Frequencies • Percentages • Modal category • Mean, median *(for ordinal variables only)*	• Mean • Mode • Median and quartiles • Range and interquartile range • Standard deviation
Bivariate statistics	• Cross-tabulations • Cramer's V • Logistic or multinomial regression	• Correlation *if independent var. are quantitative* • Simple regression
Multivariate statistics	• Logistic or multinomial regression	• Multiple regression

For your paper

- In the **first draft** (Week 6) : Describe your independent and depend variables of interest with **univariate statistics**.
- In the **second draft** (Week 9) : Explore associations between variables with **bivariate statistics**, especially between your dependent variable and several or all independent variables.
- In the **final paper** (Week 12) : Everything before + explore the associations between several variables at the same time with **multivariate analyses** (regression models) + a "Results" section.

Principles of Data Management

Principles of Data Management

Data formatting

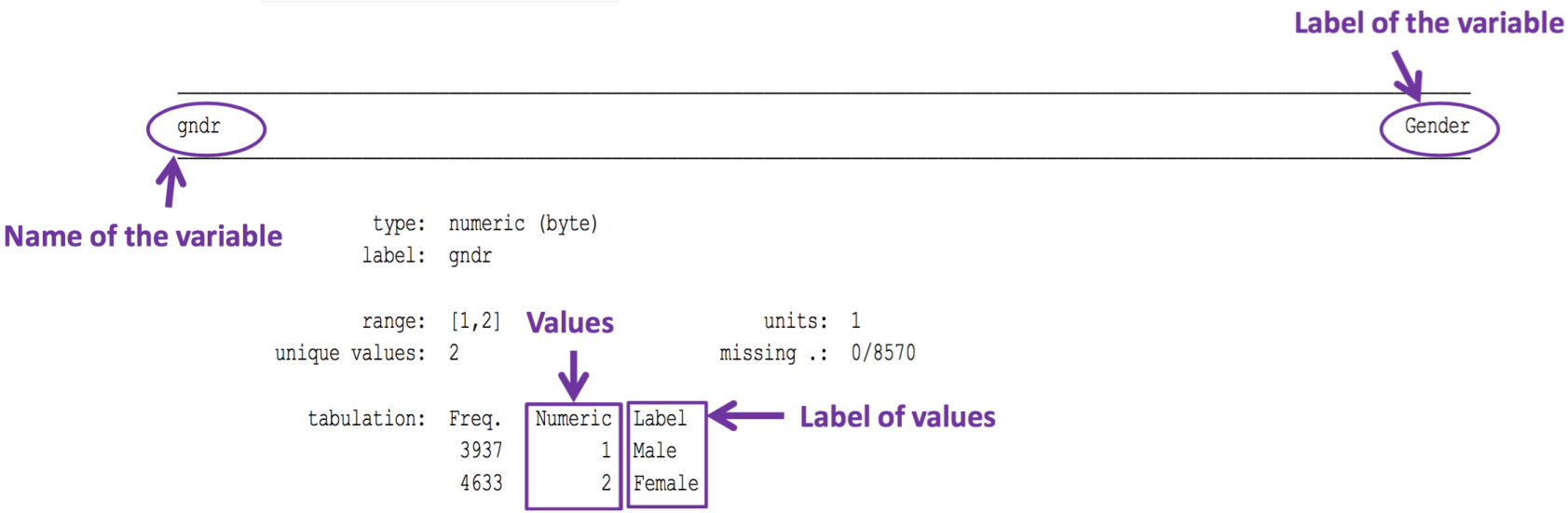
- From raw data to .dta.
- Good news : everything has been done for you !

Data subsetting

- *Definition* : Restrict your observation to a subsample of your original dataset
- In order to **make data cross-sectional** (limit data to one year) ;
- Or to limit your observations to specific category/categories you are interested in (ex : South American countries only).

Renaming and Labelling variable and values

- Use `describe var` to check the name, label, storage type, values and labels of values of your variable ;
- Use `rename var` to give a simpler name to your variable ;
- Use `label var` to give a description to your variable ;
- Use `label define` and `label values` to give a description to each value of your categorical variables ;



Encoding variables, replacing values

Not always necessary, depending on your data.

Dealing with string variables : `encode`

- String variables means their values are formatted as characters and not as numeric values ;
- To use statistical methods such as frequencies or percentages, Stata needs them to be numeric use `encode var`
- Ex : `encode gndr, gen(gender)`
- From now, use `gender` and not `gndr` in your commands.

Missing values

- Missing values may be coded with arbitrary numbers or letters, sometimes indicating a reason why there is no value (ex : the respondent refuses to answer) ;
- These numbers will be taken by Stata as numeric values instead of missing values, and calculations will be biased ;
- Use `replace` to replace missing values by "."

Recoding variable

Create a new variable

- To create a new variable from an existing one by assigning new categories, more relevant (according to you at least) ;
- The original variable still exists in case you need it ;
- Always double check after a recode to make sure is has been correctly done (cross-tab the original and the new variables) ;

Example :
Old variable agea, new variable agecat, with labels of values :

```
recode agea (min/24=1 "15-24") \\\
(25/34=2 "25-34") (35/44=3 "35- 44") \\\
(45/54=4 "45-54") (55/64=5 "55-64") \\\
(65/max=6 "65-98"), gen(agecat)
```