

The second axis

Tabular and Graphical Display of
Qualitative Data (Qualitative
variables)

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The researcher collects the raw data obtained into tables called « Frequency tables » or in graphical presentation, in order to facilitate the process of reading and understanding the results.

I- Tabular Display Qualitative Variables

Tabular display of qualitative variables is a method used in statistics and data analysis to present and summarize categorical data. Qualitative variables, also known as categorical variables, represent non-numeric data that can be divided into distinct categories or groups.

1- Frequency table: One common way to display qualitative data is through a frequency table. It lists the categories or groups (in the first column) and the number of observations that fall into each category (in second column). This provides a quick overview of the distribution of data.

Example1 : the following frequency table represents the distribution of university teacher's Rank.

Rank	Frequency (ni)
Assistant professor B	14
Assistant professor A	30
Associate professor B	35
Associate professor A	15
Professor	6
100	100

Note 1: when aggregating the data, we wrote the teacher's rank in the first column (Rank), and then calculated the number of teachers in each rank and recorded it in the second column(Frequency)

Note 2 :
statistical population : university teachers
statistical unit : teacher
statistical phenomenon : Rank

Example 2: five balls where randomly drawn, and their colors were as follows:
red, yellow, red, blue, red.

- Record this data in a suitable frequency table.
- What is the statistical population, statistical unit, statistical phenomenon of this data.

2- Relative Frequencies and percentages:

Relative Frequencies: In addition to the absolute frequencies (counts), relative frequencies are often included in the table. These are the proportions or percentages of observations in each category, which can help in comparing different categories.

$$f_i = n_i / \sum n_i \quad / \quad \sum f_i = 1$$

Percentages: Expressing the data in percentages is useful when you want to compare the relative sizes of categories, especially when dealing with large datasets.

$$f_i(\%) = (f_i = n_i / \sum n_i) * 100 \quad / \quad \sum f_i (\%) = 100$$

Example1 : the following frequency table represents the distribution of university teacher's Rank. (calculate relative frequency and percentages)

Rank	Frequency (ni)	Relative frequency (fi)	Percentage fi(%)
Assistant professor B	14	0.14	14
Assistant professor A	30	0.3	30
Associate professor B	35	0.35	35
Associate professor A	15	0.15	15
Professor	6	0.06	6
Sum	100	1	100

2- Graphical presentation of Qualitative Data

(Qualitative variables)

- **Pie Charts**: Pie charts can also be used to show the distribution of qualitative data. Each category is represented as a slice of the pie, with the size of the slice proportional to the percentage of observations in that category.

the pie chart can be drawn by calculating the angle using following formula:

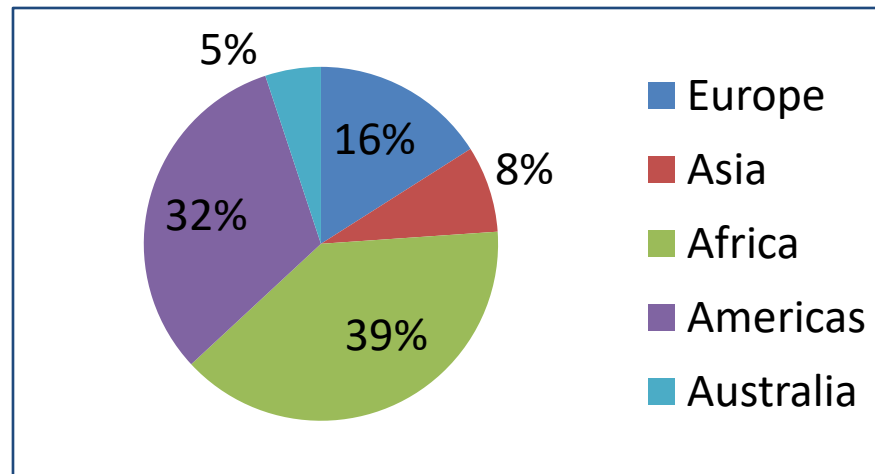
$$\text{Angle } (^{\circ}) = (n_i / \sum n_i) * 360^{\circ}$$

$$\text{Angle } (^{\circ}) = f_i * 360^{\circ}$$

Example : the following frequency table represents the global Gold production by continent for the year « t »

Continents	Quantity of Gold	Central angle(°)
Europe	176	57.6
Asia	87	28.47
Africa	431	141.45
Americas	350	114.54
Australia	56	18.32
Σn_i	1100	366

Pie Chart represents the global Gold production by continent for the year « t »



- **Bar Charts**: Another way to visually display qualitative data is through bar charts. Each category is represented by a bar, and the height of the bar corresponds to the frequency or percentage of observations in that category.

Exemple : we use the same previous example to represent the bar chart.

Bar Chart represente the global Gold production by continent for the year

« t »

