Practical Work 01

Initiation to SPSS Software

Data Entry and Variable Definition

Objective of the Session

The goal of this TP is to familiarize students with the IBM SPSS Statistics environment. By the end of this session, you will be able to:

I) Navigate the SPSS interface and understand its dual-window system.

II) Correctly define statistical variables (Qualitative vs. Quantitative).

III) Input data and perform basic frequency analysis.

1. Introduction to the SPSS Interface

When you launch the software via **Start** > **All Programs** > **IBM SPSS Statistics**, you are presented with the Data Editor.

1.1 The Main Window

The main window looks like a spreadsheet, but unlike Excel, it has two distinct functional views.

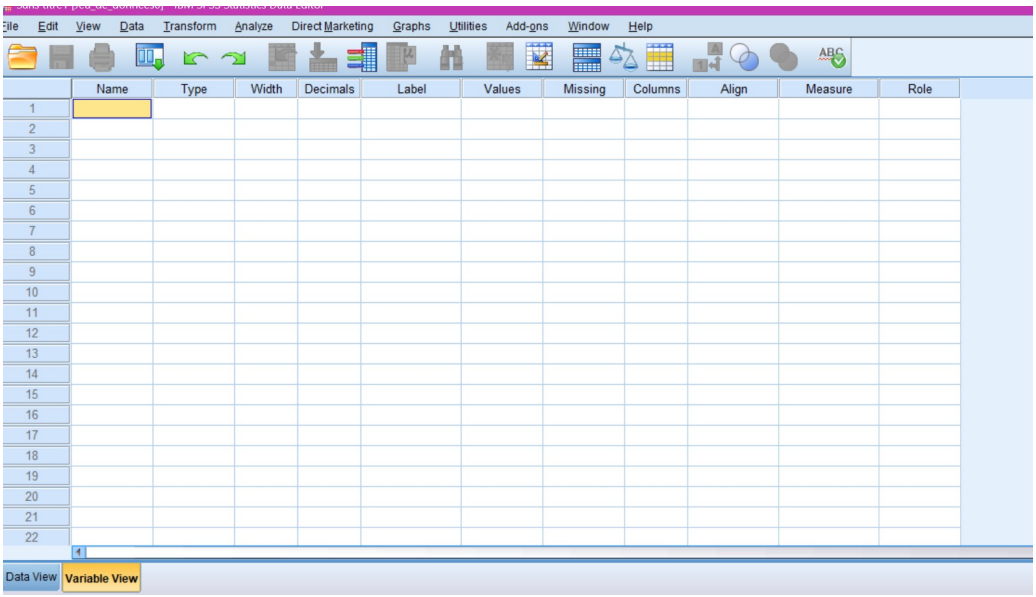

Figure 1: The IBM SPSS Statistics Data Editor Window.

1.2 Data View vs. Variable View

At the bottom-left corner of the screen, you will see two tabs. This is the most important part of the initiation:

- **Data View:** Used for entering the raw measurements (values).
- **Variable View:** Used for defining the properties of the data (the "metadata").

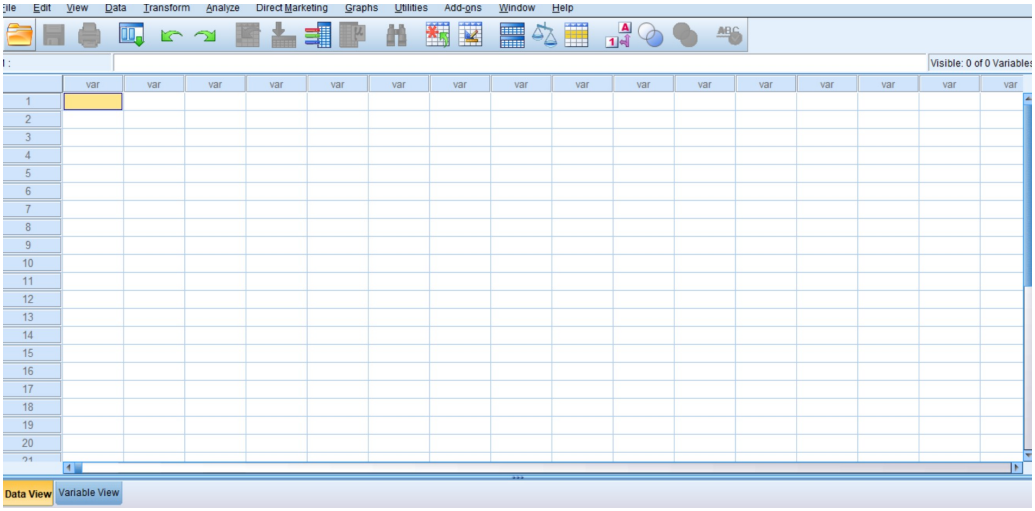

Figure 2: Switching between the two display modes.

2. Defining Statistical Variables

In Biology, we deal with various types of data (pH, Weight, Species, Blood Type). We must define these in the **Variable View** tab before entering any numbers.

2.1 Understanding Variable Attributes

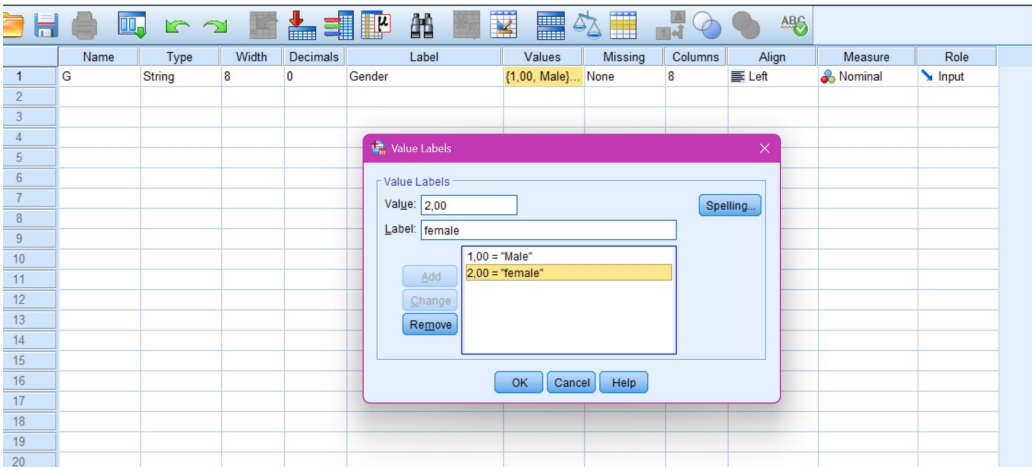

Figure 3: Variable View Columns

- **Name:** A short unique code (e.g., `Temp`). No spaces or symbols allowed.

- **Type:** Choose **Numeric** for measurements or **String** for text.
- **Label:** Write the full name (e.g., *"Temperature of the incubator"*).
- **Values:** This is where you code categories. (Example: 1 = "Control", 2 = "Treated").
- **Measure:**
  - **Scale:** For continuous data (Weight, Height).
  - **Nominal:** For categories (Color, Gender).
  - **Ordinal:** For ranked data (Severity: Low, Medium, High).

2.2 The Value Labels Dialog

For qualitative data, click the small blue button in the "Values" cell to open the coding window.

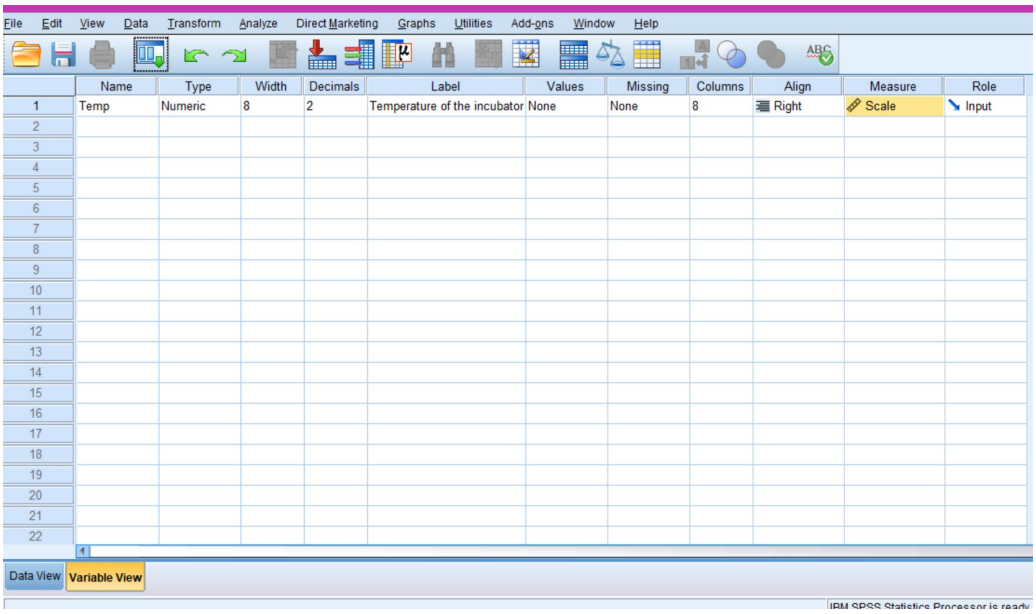

Figure 4: Value Labels Window

3. Practical Applications

Application 1: Qualitative Data (Blood Groups)

A biologist tests 10 students for their blood groups: **A, B, O, A, AB, O, A, B, O, A**.
First Method:

1. Go to **Variable View**. Create a variable named `BG`.
2. Set the Measure to **Nominal**.
3. In **Values**, define: 1="A", 2="B", 3="AB", 4="O".
4. Go to **Data View** and enter the corresponding numbers (1, 2, 4, etc.).
5. Go to **analyze** > **Descriptive statistic** > **Frequencies**.
6. Follow the steps on the pictures to get the statistics data informations and graphs.

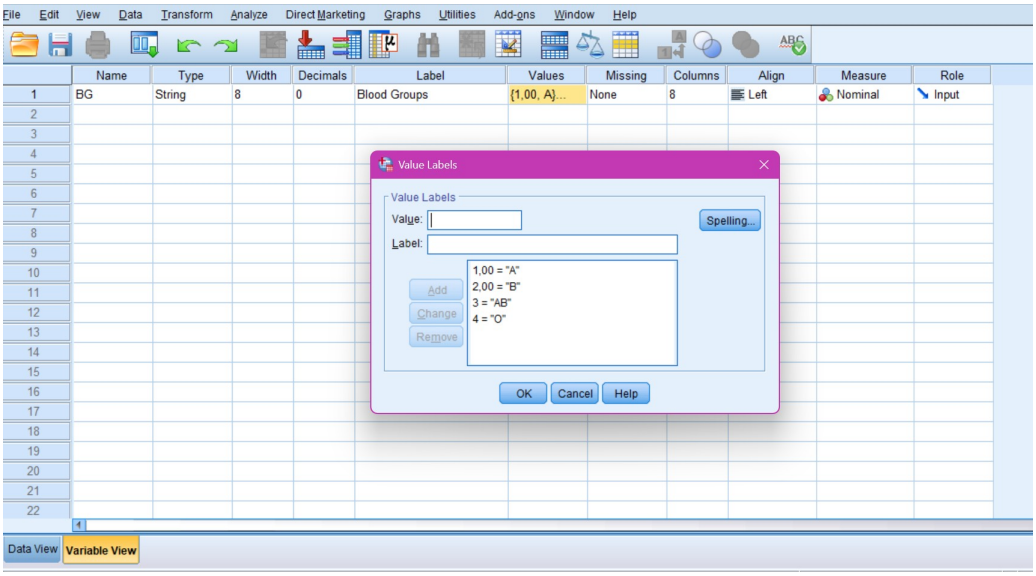

Figure 5: First Method VARIABLE VIEW

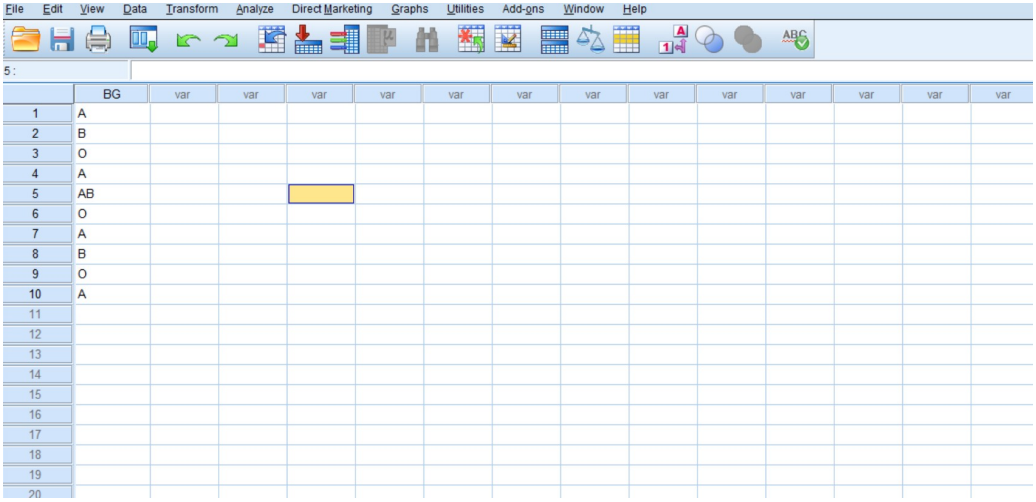

Figure 6: First Method DATA VIEW

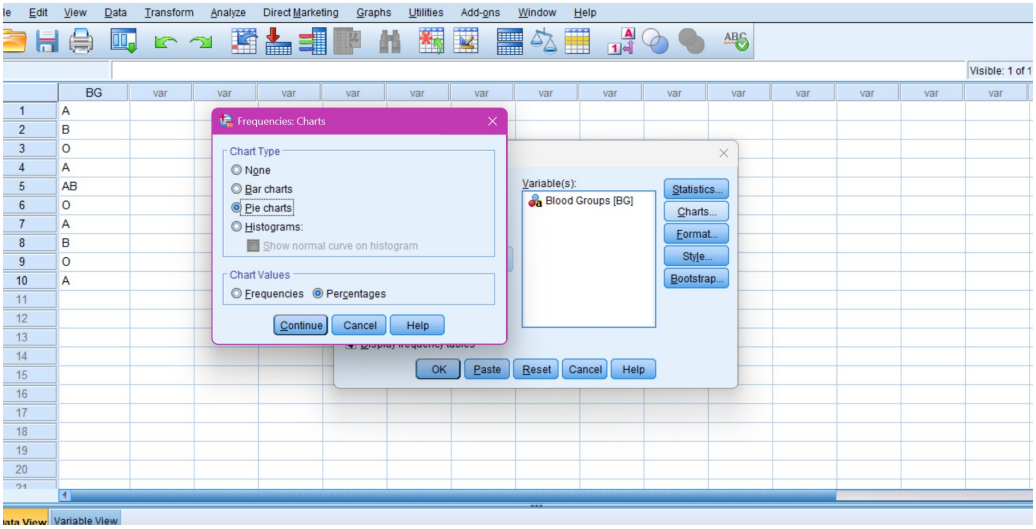

Figure 7: First Method 1st Step

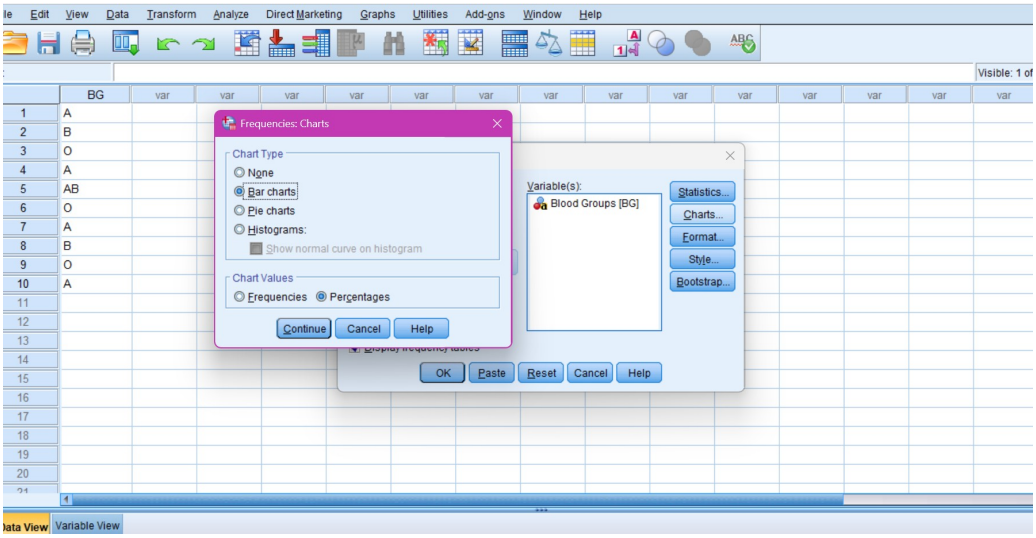

Figure 8: First Method 2nd Step

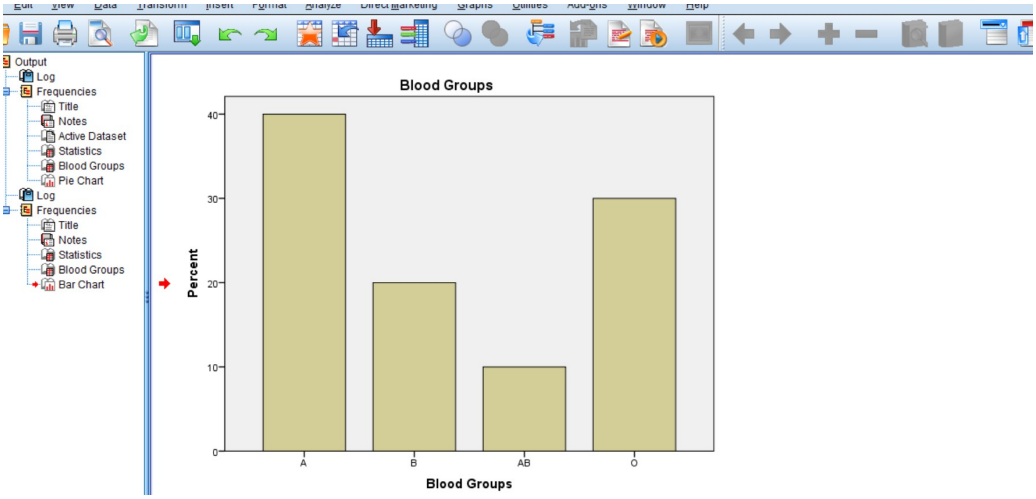

Figure 9: First Method 3rd Step

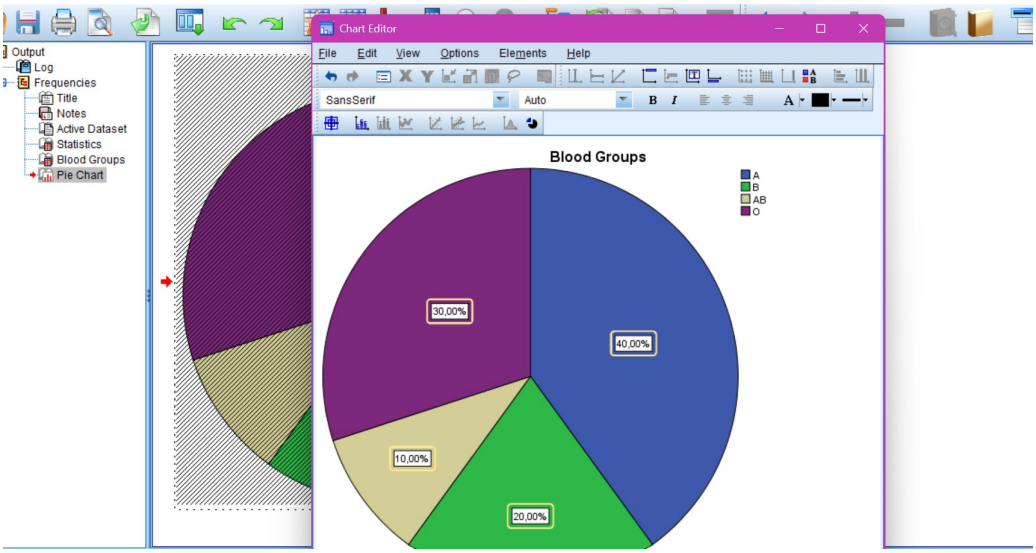

Figure 10: First Method 4th Step

Second Method:

1. Go to **Variable View**. Create two variables named `BG` for the **blood group** and `FR` for **frequency**.
2. Set the Measure to **Nominal** and **scale** respectively .
3. In **Values** corresponding to `BG`, define: 1="A", 2="B", 3="AB", 4="O".
4. Enter data on the window **DataView**.
5. Go to **Data** > **Weight cases**, then choose **weight cases by** and enter **Frequency**. This step is necessary when we use frequencies.
6. Finally, follow the steps from one to four just like we done in the first method.

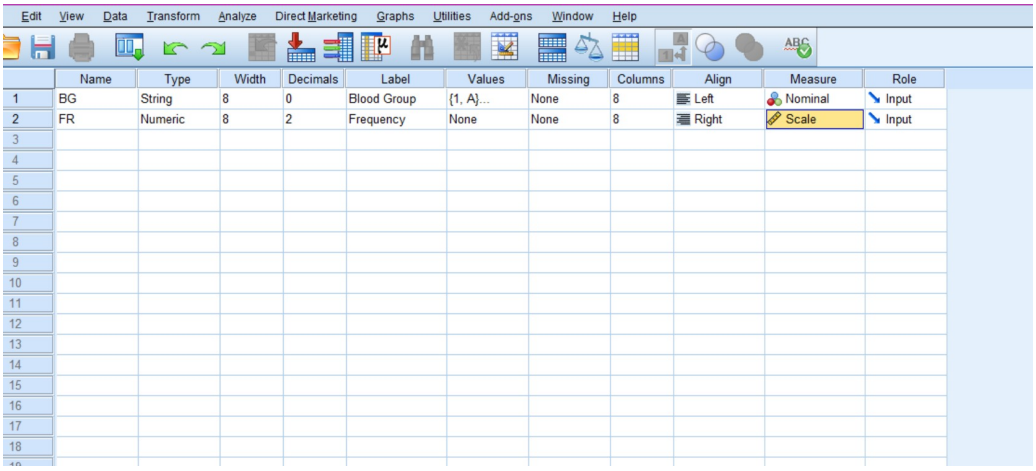

Figure 11: Second Method Variable View

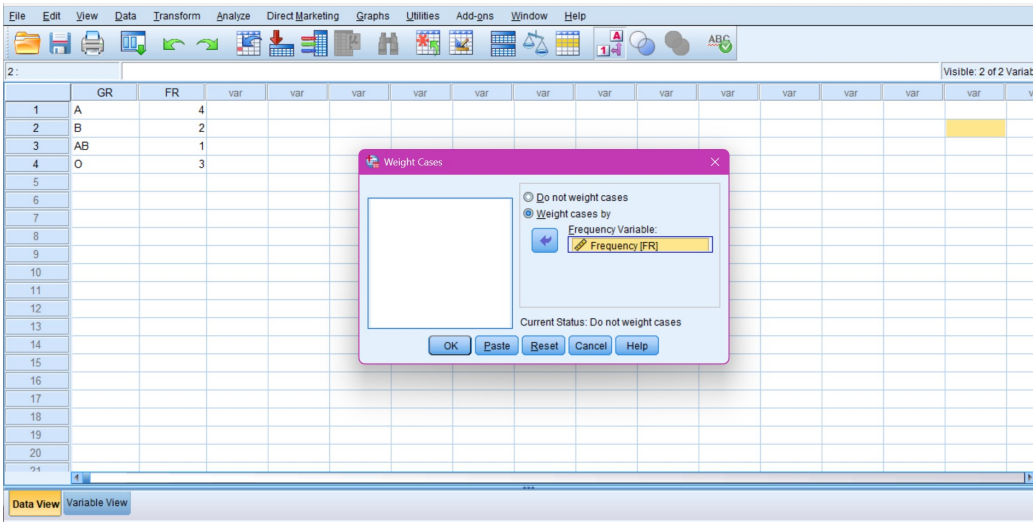

Figure 12: Data View

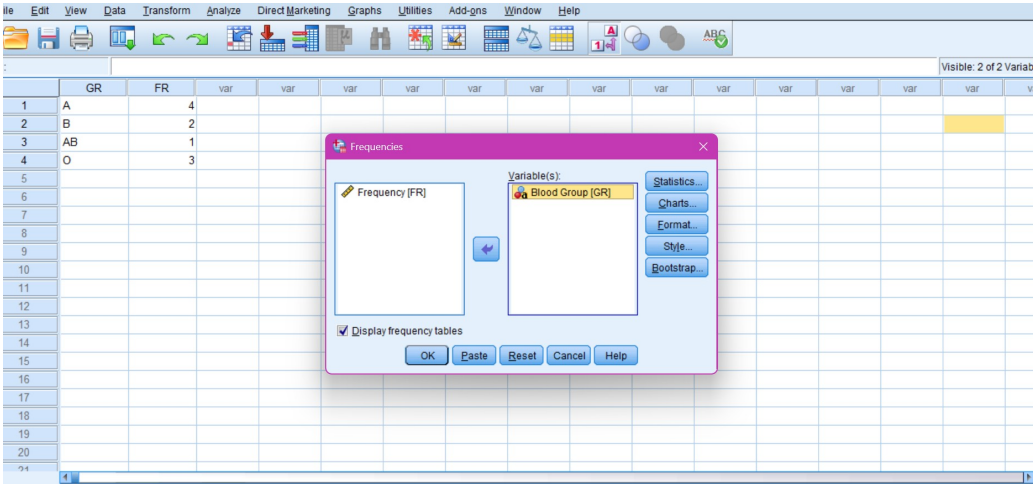

Figure 13: Necessarian Step

Application 2: Quantitative Data (Plant Height)

Heights (cm) of 5 plants: **12.5, 14.0, 12.5, 15.2, 12.5**.

1. Create a variable `Height`. Set Measure to **Scale**.
2. Set **Decimals** to 1.
3. Enter the numbers directly into the **Data View**.

To calculate **all** parameters (Central Tendency and Dispersion) and plot a graph:

1. Go to **Analyze** > **Descriptive Statistics** > **Frequencies**.
2. Move `Height` to the "Variable(s)" box.
3. Click **Statistics...** and check the following:
   - **Central Tendency:** Mean, Median, Mode, and Sum.
   - **Dispersion:** Std. deviation, Variance, Range, Minimum, and Maximum.
4. Click **Continue**.
5. Click **Charts...**
   - Select **Bar chart**.
6. Click **Continue** and then **OK**.

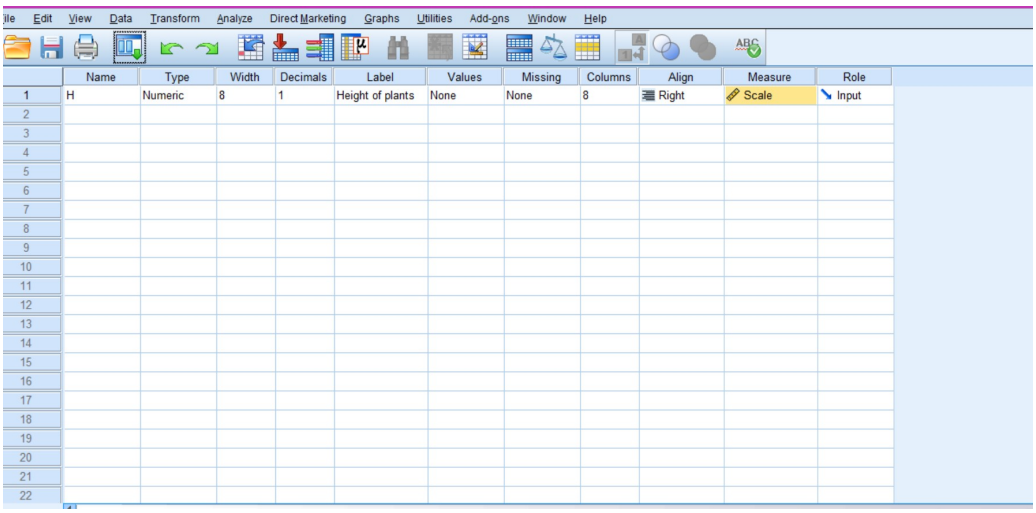

Figure 14: Quantitative Variable

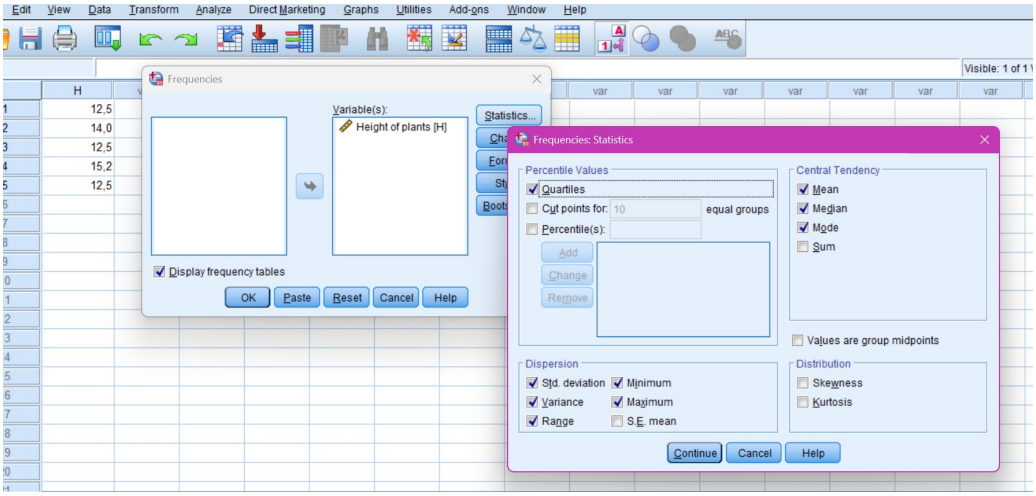

Figure 15: Show Parameters

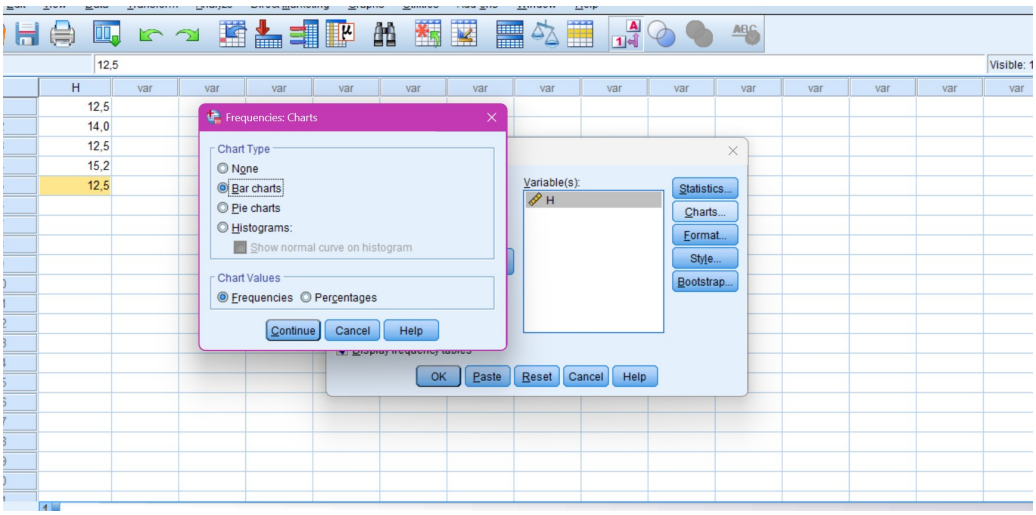

Figure 16: Plot the Bar Chart

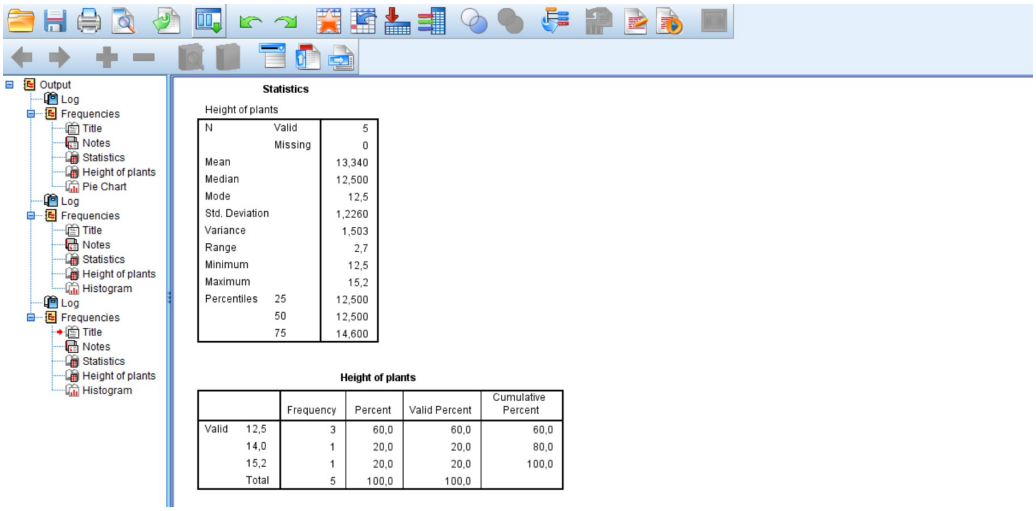

Figure 17: Results

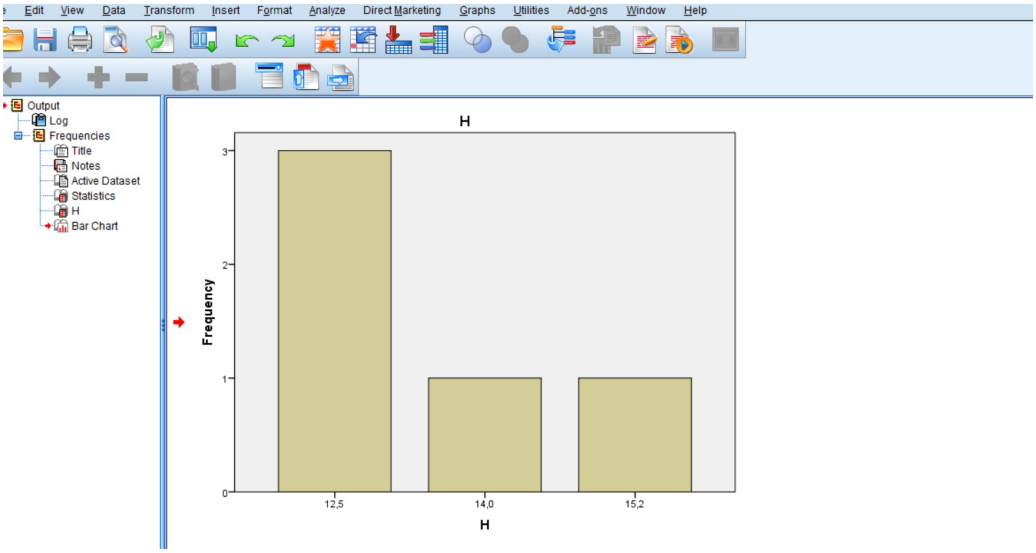

Figure 18: The Plot

4. Saving Your Work

Always save your files in your personal folder in directory **D:**.

- **.sav** file: Contains your data.
- **.spv** file: Contains your output/results.

5. Exercise

A researcher is studying the effect of a fertilizer on 8 plants. Enter the following data into a new SPSS file:

Plant_ID	Treatment	Health_Status	Leaves_Count
1	Control	Good	12
2	Treated	Excellent	18
3	Control	Poor	8
4	Treated	Good	15
5	Control	Good	11
6	Treated	Excellent	20
7	Control	Poor	7
8	Treated	Good	14

Tasks:

1. Define `Treatment` as Nominal (1=Control, 2=Treated).
2. Define `Health_Status` as **Ordinal** (1=Poor, 2=Good, 3=Excellent).
3. Calculate the **Mean** number of leaves.
4. Create a **Bar Chart** showing the frequency of Health Status.

— End of Practical Work 01 —