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SMART DATA ANALYSIS WITH SPSS

A Guide to Descriptive Statistics



By

Dr. B. Kirubhaharan

Dr. J. Anand

SMART DATA ANALYSIS WITH SPSS: A GUIDE TO DESCRIPTIVE STATISTICS

Dr.B.Kirubhaharan

Assistant Professor and Head in Commerce -Business Analytics

G VENKATASWAMY NAIDU COLLEGE KOVILPATTI

Dr.J.Anand

Assistant Professor in PG Research Department of Commerce

G VENKATASWAMY NAIDU COLLEGE KOVILPATTI

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Author	Dr.B.Kirubhakaran Assistant Professor and Head in Commerce -Business Analytics G VENKATASWAMY NAIDU COLLEGE KOVILPATTI
Co-Authors	Dr.J.Anand Assistant Professor in PG Research Department of Commerce G VENKATASWAMY NAIDU COLLEGE KOVILPATTI
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PREFACE:

In the present era of data-driven decision-making, the ability to analyze and interpret data has become an essential skill for students, researchers, and professionals. With the rapid growth of information technology and statistical software, tools such as Statistical Package for the Social Sciences (SPSS) have made data analysis more accessible and efficient. SPSS is widely used in social sciences, management studies, business research, and many other academic and professional fields for analyzing quantitative data.

The book “**Smart Data Analysis with SPSS: A Guide to Descriptive Statistics**” is designed to provide a clear and practical understanding of descriptive statistical techniques using SPSS. Descriptive statistics form the foundation of data analysis, as they help summarize, organize, and present data in a meaningful way. Techniques such as frequency distribution, percentage analysis, mean, median, mode, standard deviation, and graphical representations enable researchers to understand patterns and trends in data effectively.

This book aims to simplify the process of learning SPSS for beginners as well as for students pursuing courses in management, commerce, economics, and social sciences. The contents are presented in a systematic and step-by-step manner, enabling readers to understand how to enter data, perform descriptive analysis, and interpret the output generated by SPSS.

Special emphasis has been given to practical examples, simple explanations, and interpretation of results so that readers can easily apply these techniques in their research projects, dissertations, and academic studies. The book also focuses on developing analytical thinking and enhancing the ability to draw meaningful conclusions from statistical data.

It is hoped that this book will serve as a useful guide for students, researchers, and faculty members who wish to gain a strong foundation in descriptive statistics using SPSS. Constructive suggestions and feedback from readers are always welcome for improving future editions of this book.

Dr.B.Kirubhakaran

Assistant Professor and Head in Commerce -Business Analytics

G VENKATASWAMY NAIDU COLLEGE KOVILPATTI

Dr.J.Anand

Assistant Professor in PG Research Department of Commerce

G VENKATASWAMY NAIDU COLLEGE KOVILPATTI

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CHAPTER I

1.1 RESEARCH

Meaning of Research

Research is a systematic and organized process of collecting, analyzing, and interpreting information to increase knowledge or solve a specific problem. It involves careful investigation and study to discover new facts, verify existing knowledge, or develop new theories.

Definitions of Research

Some well-known definitions of research are:

1. C.R. Kothari:
“Research is a scientific and systematic search for pertinent information on a specific topic.”
2. Clifford Woody:
“Research comprises defining and redefining problems, formulating hypotheses, collecting, organizing and evaluating data, making deductions and reaching conclusions.”
3. Redman and Mory:
“Research is a systematised effort to gain new knowledge.”
4. Kerlinger:
“Research is a systematic, controlled, empirical and critical investigation of hypothetical propositions about the presumed relations among natural phenomena.”

Objectives of Research

The objectives of research refer to the main goals or purposes for conducting a research study. Research is carried out to discover new facts, verify existing knowledge, and solve problems in a systematic way.

Major Objectives of Research

- To Gain New Knowledge
Research helps to discover new facts and increase existing knowledge in a particular field.
- To Identify and Analyze Problems
One of the main objectives of research is to identify problems and study them in detail.
- To Test Hypotheses and Theories
Research helps to test the validity of existing theories and hypotheses.
- To Establish Relationships
It helps to identify the relationship between different variables or factors.
- To Develop New Concepts and Methods
Research leads to the development of new ideas, techniques, and methods.
- To Provide Solutions to Problems
Research helps in finding practical solutions to social, economic, and business problems.
- To Support Decision Making
Research provides reliable information for better planning and decision making.
- To Predict Future Trends
Research helps in forecasting future developments and trends

Importance of Research

Research plays an important role in education, business, and society. The major importance of research is:

1. Development of Knowledge

Research helps to discover new knowledge and expand existing knowledge.

2. Problem Solving

It helps to identify problems and find suitable solutions.

3. Decision Making

Research provides reliable information for effective decision-making in business and management.

4. Improvement in Policies and Practices

Research findings help organisations and governments improve policies and strategies.

5. Innovation and Development

It promotes new ideas, innovations, and technological advancement.

6. Understanding Social Issues

Research helps to analyze social, economic, and organisational problems.

7. Academic Growth

It improves teaching, learning, and academic development in educational institutions.

Multiple Choice Questions (MCQs) on Research:

1. Research is defined as:

- a) Random observation
- b) Systematic search for knowledge
- c) Guessing information
- d) Informal discussion

Answer: b) Systematic search for knowledge

2. Who defined research as “a scientific and systematic search for pertinent information on a specific topic”?

- a) Kerlinger
- b) C.R. Kothari
- c) Redman and Mory
- d) Clifford Woody

Answer: b) C.R. Kothari

3. The main purpose of research is to:

- a) Increase confusion
- b) Gain new knowledge
- c) Waste time
- d) Avoid problems

Answer: b) Gain new knowledge

4. Research helps in:

- a) Decision making
- b) Ignoring problems
- c) Avoiding analysis
- d) Creating rumors

Answer: a) Decision making

5. Research is conducted to:
- a) Find solutions to problems
 - b) Increase problems
 - c) Reduce knowledge
 - d) Avoid information

Answer: a) Find solutions to problems

6. Which of the following is an objective of research?
- a) Creating bias
 - b) Discovering new facts
 - c) Ignoring data
 - d) Making assumptions

Answer: b) Discovering new facts

7. Research involves:
- a) Careful investigation
 - b) Random guessing
 - c) Personal opinion
 - d) Unplanned activities

Answer: a) Careful investigation

8. Testing a hypothesis is part of:
- a) Research process
 - b) Entertainment
 - c) Advertising
 - d) Marketing

Answer: a) Research process

9. Research helps in improving:
- a) Knowledge and understanding
 - b) Confusion
 - c) Uncertainty
 - d) Ignorance

Answer: a) Knowledge and understanding

10. Research is important in:
- a) Education only
 - b) Business only
 - c) Society only
 - d) All of the above

Answer: d) All of the above

1.2 HYPOTHESIS:

A hypothesis is a proposed explanation for a phenomenon, which is testable and falsifiable.

There are two primary types:

- ✓ The **null hypothesis**, which predicts no difference or relationship between variables, and the alternative hypothesis, which predicts that there is a difference or relationship.
- ✓ The **alternative hypothesis** can be directional, specifying the nature of the expected difference, or non-directional, simply stating that a difference exists without predicting its direction. Hypotheses are crucial for guiding research, as they allow scientists to test specific predictions and refine theories.

1.3 SIGNIFICANCE LEVEL:

Meaning of Significance Level:

- The significance level represents the maximum acceptable probability of making a Type I error. If you set a significance level of 0.05, you're saying that there's a 5% chance you're willing to accept the risk of incorrectly rejecting the null hypothesis.
- If the p-value (probability value) from a statistical test is less than or equal to the significance level, you reject the null hypothesis. If the p-value is greater than the significance level, you fail to reject the null hypothesis.

For example, if your significance level is 0.05, and you obtain a p-value of 0.03, you would reject the null hypothesis, because 0.03 is less than 0.05.

Common Types of Significance Levels

There are several common significance levels used in hypothesis testing, depending on the field of study and the acceptable risk of error. These are some of the most frequently used:

1. 0.05 (5%)

This is the most common significance level. It means there is a 5% chance of rejecting the null hypothesis when it is true (i.e., a 5% risk of a Type I error). This level is widely used in many fields, especially social sciences, biology, and medical research.

2. 0.01 (1%)

A more stringent significance level, indicating a 1% risk of a Type I error. This is used when researchers want to be more confident in their results, such as in high-stakes scientific or medical studies where the consequences of false positives could be severe (e.g., clinical trials).

3. 0.10 (10%)

This is a less stringent level, indicating a 10% chance of a Type I error. It's used in exploratory research or when the cost of a false positive is relatively low. It might also be used in fields like economics, where results are interpreted with more caution.

4. 0.001 (0.1%)

This is an even stricter level, sometimes used in areas where extreme precision is required, such as in fundamental physics or certain highly regulated industries. Researchers want to make very sure their findings are not due to chance.

Choosing the Significance Level

The significance level is typically set before the analysis begins and is based on the following considerations:

- **Risk of Type I error:** A lower significance level (e.g., 0.01) means you're minimizing the risk of incorrectly rejecting a true null hypothesis.
- **Field of study:** In some disciplines, a 0.05 significance level is standard, while in others (e.g., medical research), more stringent levels like 0.01 are used.
- **Consequences of errors:** If the consequences of making a Type I error are severe, a more stringent significance level might be chosen (e.g., 0.01 or 0.001). On the other hand, for preliminary studies or where consequences are minimal, a higher significance level (e.g., 0.10) may be acceptable.

Related Terms:

p-value: The p-value tells you the probability of observing your data (or something more extreme) under the assumption that the null hypothesis is true. If the p-value is less than or equal to the significance level, you reject the null hypothesis.

- **Type I error (False Positive):** Rejecting the null hypothesis when it is actually true.
- **Type II error (False Negative):** Failing to reject the null hypothesis when it is false.

Multiple Choice Questions on Hypothesis (Research Methodology)

1. What is a hypothesis in research?

- A) A proven theory
- B) A tentative statement about the relationship between variables
- C) A statistical tool
- D) A research report

Answer: B) A tentative statement about the relationship between variables

2. A hypothesis that states there is no relationship between variables is called:

- A) Alternative hypothesis
- B) Directional hypothesis
- C) Null hypothesis
- D) Statistical hypothesis

Answer: C) Null hypothesis

3. Which of the following represents the alternative hypothesis?

- A) H_0
 - B) H_1
 - C) μ
 - D) σ
- Answer: B) H_1

4. The null hypothesis is usually denoted as:

- A) H_0
- B) H_1
- C) H_2
- D) H_3

Answer: A) H_0

5. A hypothesis that predicts the direction of the relationship between variables is called:

- A) Non-directional hypothesis
- B) Directional hypothesis
- C) Null hypothesis
- D) Simple hypothesis

Answer: B) Directional hypothesis

6. A hypothesis that states a relationship between two variables is known as:

- A) Complex hypothesis
- B) Simple hypothesis
- C) Directional hypothesis
- D) Statistical hypothesis

Answer: B) Simple hypothesis

7. A hypothesis involving more than two variables is called:

- A) Simple hypothesis
- B) Complex hypothesis
- C) Null hypothesis
- D) Directional hypothesis

Answer: B) Complex hypothesis

8. The main purpose of a hypothesis is to:

- A) Prove a theory
- B) Guide the research study
- C) Replace data collection
- D) Avoid analysis

Answer: B) Guide the research study

9. Which of the following is a characteristic of a good hypothesis?

- A) It should be vague
- B) It should be testable
- C) It should be very long
- D) It should avoid variables

Answer: B) It should be testable

10. Hypothesis testing is mainly used in:

- A) Descriptive research
 - B) Statistical analysis
 - C) Literature review
 - D) Case study
- Answer: B) Statistical analysis

SCALE IN SPSS (MEANING):

A scale in IBM SPSS Statistics refers to a measurement level used for continuous numerical data. It represents variables that have meaningful numeric values and equal intervals between numbers.

Example:

Age (20, 25, 30), Income, Height, and Marks obtained by students. These values can be measured, compared, and used for statistical analysis, such as mean and standard deviation.

Types of Scale (Measurement Scales in Research):

Measurement scales are used to classify, organise, and measure data in research and statistics.

The main types of scales are:

1.Nominal Scale:

A nominal scale classifies data into different categories without any order.

Example: Gender – Male, Female.

2.Ordinal Scale:

An ordinal scale arranges data in a meaningful order or ranking.

Example: Satisfaction level – Poor, Average, Good.

3.Interval Scale:

An interval scale has equal intervals between values but no true zero point.

Example: Temperature in Celsius.

4.Likert Scale:

A Likert scale measures attitudes or opinions using a range of responses.

Example: Strongly Agree, Agree, Neutral, Disagree, Strongly Disagree.

Multiple Choice Questions on Nominal Scale, Ordinal Scale, Interval Scale, and Likert Scale

1. Which scale is used to classify data into distinct categories?

- A) Ordinal Scale
- B) Interval Scale
- C) Nominal Scale
- D) Ratio Scale

Answer: C) Nominal Scale

2. Gender classification (Male/Female) is an example of:

- A) Interval Scale
- B) Nominal Scale
- C) Ordinal Scale
- D) Likert Scale

Answer: B) Nominal Scale

3. Which scale arranges data in order or ranking?

- A) Nominal Scale
- B) Interval Scale
- C) Ordinal Scale
- D) Likert Scale

Answer: C) Ordinal Scale

4. Ranking students as 1st, 2nd, and 3rd is an example of:

- A) Nominal Scale
- B) Ordinal Scale
- C) Interval Scale
- D) Ratio Scale

Answer: B) Ordinal Scale

5. Which scale measures the difference between values but has no true zero point?

- A) Nominal Scale
- B) Ordinal Scale
- C) Interval Scale
- D) Ratio Scale

Answer: C) Interval Scale

6. Temperature measured in Celsius or Fahrenheit is an example of:

- A) Nominal Scale
 - B) Ordinal Scale
 - C) Interval Scale
 - D) Likert Scale
- Answer: C) Interval Scale

7. The Likert scale is commonly used to measure:

- A) Age
- B) Opinions and attitudes
- C) Gender
- D) Income

Answer: B) Opinions and attitudes

8. Which of the following is an example of a Likert scale response?

- A) Male/Female
- B) Yes/No
- C) Strongly Agree – Agree – Neutral – Disagree – Strongly Disagree
- D) High/Low

Answer: C) Strongly Agree – Agree – Neutral – Disagree – Strongly Disagree

9. Which scale only identifies categories without ranking or measuring differences?

- A) Nominal Scale
- B) Interval Scale
- C) Ordinal Scale
- D) Likert Scale

Answer: A) Nominal Scale

10. Likert scale responses are generally considered as:

- A) Nominal data
- B) Ordinal data
- C) Interval data
- D) Ratio data

Answer: B) Ordinal data

CHAPTER II

2.1 INTRODUCTION TO SPSS 21

International Business Machine Corporation developed by the Statistical Package for the Social Sciences twenty-one. The statistical software set is extensively used for data analysis in different fields, such as social sciences, market research, health research, and education. It is one of the later versions of the SPSS software, with better features and improvements over the previous iteration.

Benefits

- Statistical Package for the Social Sciences is often favoured by beginners due to its user-friendly software.
- It has a simple interface and detailed help documentation.
- Extended Support for Statistical Procedures supports a massive collection of statistical tests and techniques. It makes it a one-stop explanation for most data research needs.
- The users to develop data visualisation are high-quality diagrams and graphs, such as histograms, box plots, bar charts, scatter plots, and more. Customisation options allow users to modify visual elements like colours, labels, and axes.
- Statistical package for social science produces measureless data manipulation and management tools. It provides efficient cleaning and data preparation for analysis.

COMMON APPLICATIONS:

1. The Statistical Package for the Social Sciences has been a longstanding choice in specialisations like psychology, sociology, and education for conducting surveys and experimental research, which is also called **Social Science Research**.

Businesses use Statistical packages for social science to investigate buyer behaviour, sales data, and marketing tendencies, which is also called **Market Research**.

3. Statistical packages for social science that help healthcare researchers analyse clinical trials, epidemiological studies, and health surveys are also called **Health Research**.
4. Statistical packages for social science are widely used for analysing large public datasets, census data, and social trends, also called **Government and Policy Analysis**.

THE SPSS ENVIRONMENT

The Statistical packages for the social science environment may come across as confusing at first, but it is analytical once you get familiar with them. In this part of the direction, we will examine the following characteristics of the SPSS environment:

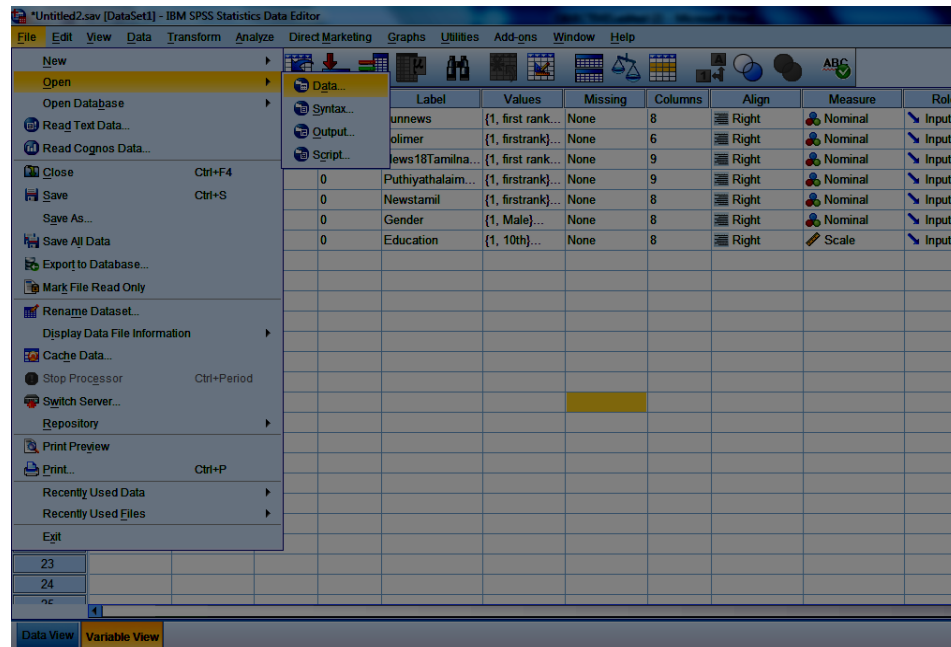
1. General Functions
2. Variable View
3. Creating a New Data Set
4. Data View
5. Syntax
6. Output

2.2 General Functions

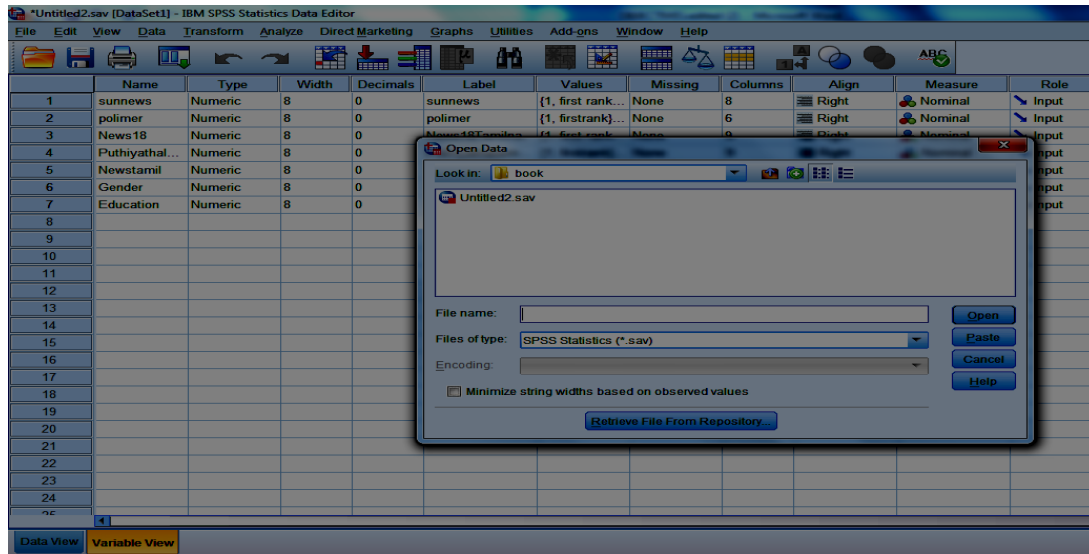
The SPSS menu works similarly to the menus in many other programs, such as Word or Excel. Some useful options are listed below:

Open a document:

Step 1: Go to file >Open and select Data, Syntax, or Output. To browse the hard drive file click open.

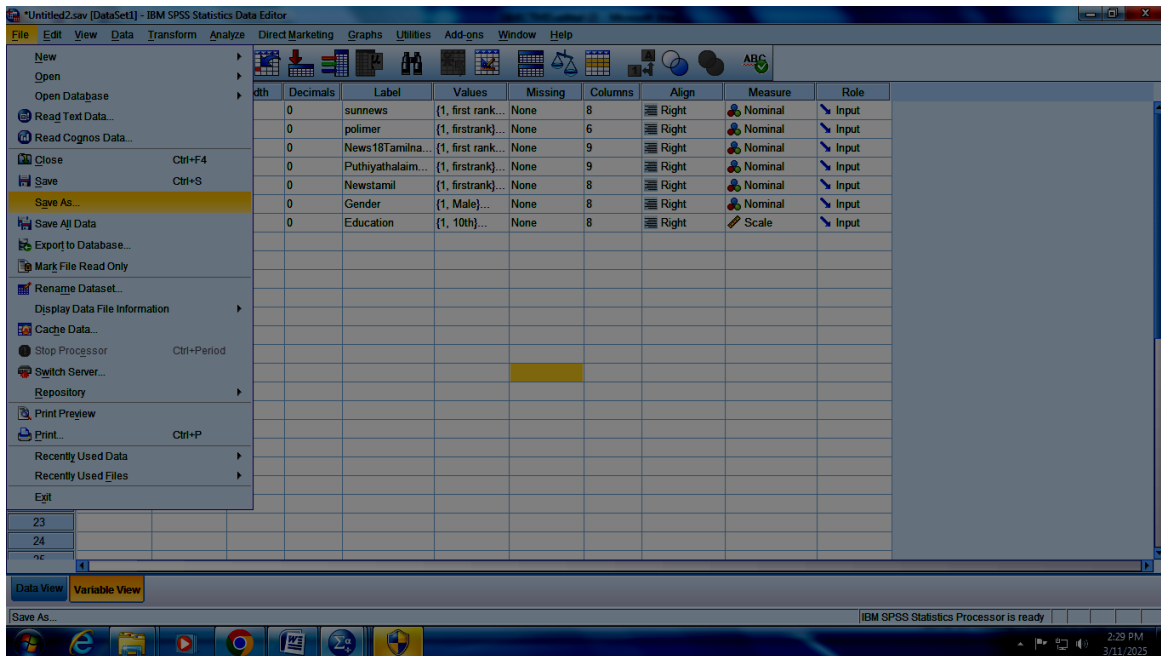


Step 2 To browse the hard drive file and click open

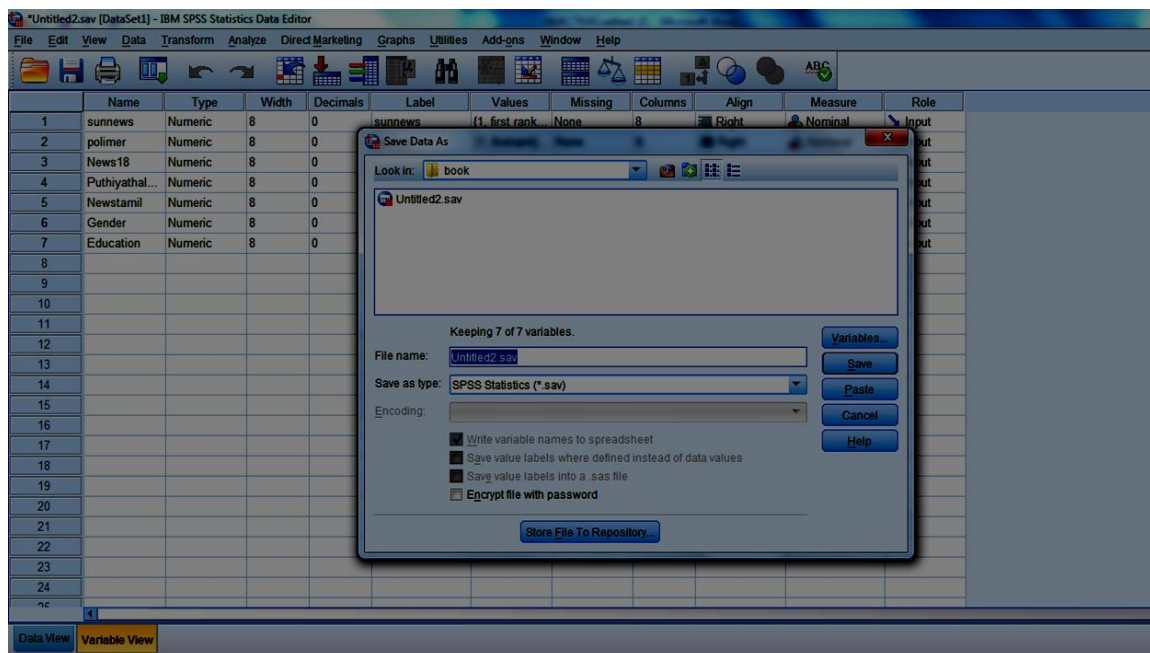


Save a document:

Step 1:Go to File > Save As.



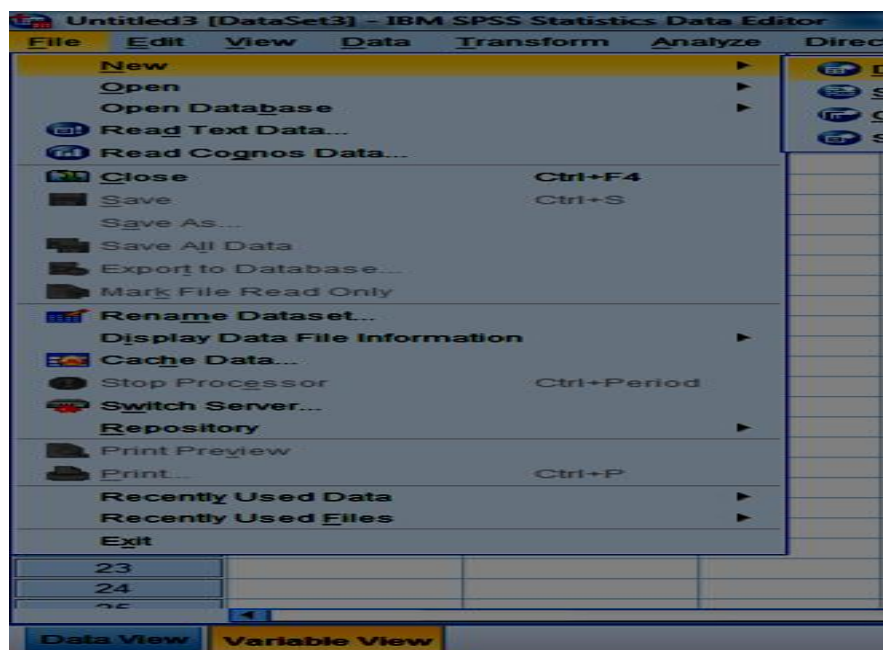
Step 2:Type in a descriptive surname and after that click >Save.



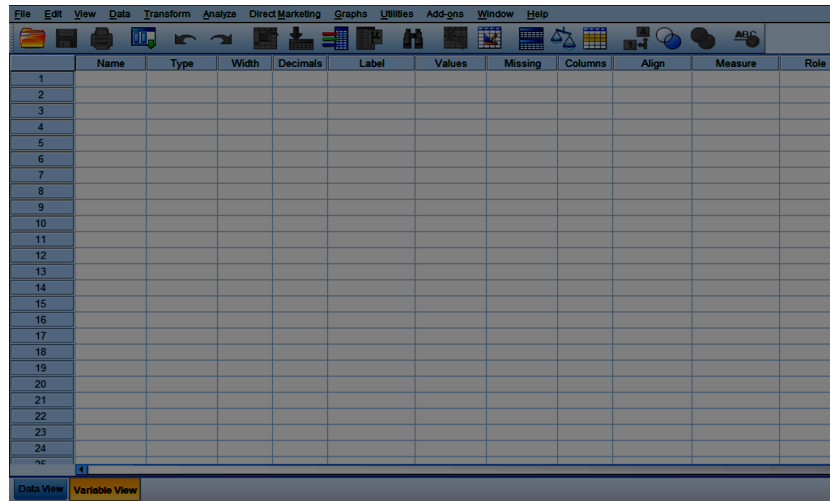
2.3 Creating a New Data Set

If you have a sample questionnaire, you can easily make the corresponding data structure in Variable View in SPSS.

Step 1 :Go to File > Select New >Click Data >Data sheet open



Step 2: Datasheet open

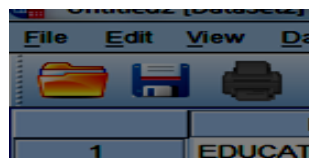


2.4 Variable View

In Variable View, different columns are shown. Each line compares to a variable. A variable is a quantity that varies and can be measured, such as height, weight, number of children, academic level, gender, and so on.

Functions

Name: Name of the variable. It is your choice, but make it understandable, and do not use numbers or symbols as the first letter, since SPSS will not accept them. Moreover, you cannot use spaces in the name. For example: "education level."



Type: Type: Indicates the variable type. The most common are Numeric numbers. It only accepts numerical data, for example, age or number of children) and String (which also accepts letters, e.g., for qualitative questions). Generally, all responses in a questionnaire are transformed into

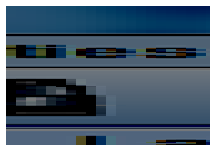
numbers. For example: "Man"=0 and "Woman"=1, or "Non-smoker"=1, "Ex-smoker"=2, and "Current smoker"=3.

Width: Width: Checks the number of characters that are allowed to be typed in the data cell. The default for numerical and string variables is 8, which only needs to be changed if you want to type in long strings of numbers or whole sentences.

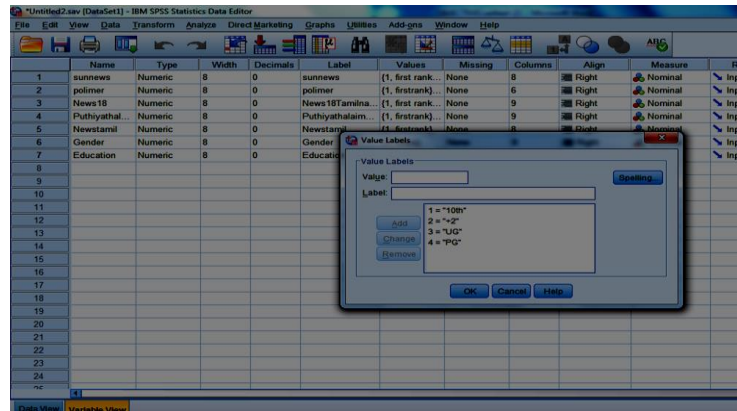
Decimals: Decimals: Default is 2 for numerical variables and will automatically be shown as .00 in the data view if not otherwise determined.

Label: The description of the variable. Use the question that the variable is founded upon or something else, accurately clarifying the variable. For example: "What is your highest level of education?"

The description of the variable. Use the question that the variable is based upon or something else accurately describing the variable. For example: "What is your highest level of education?"



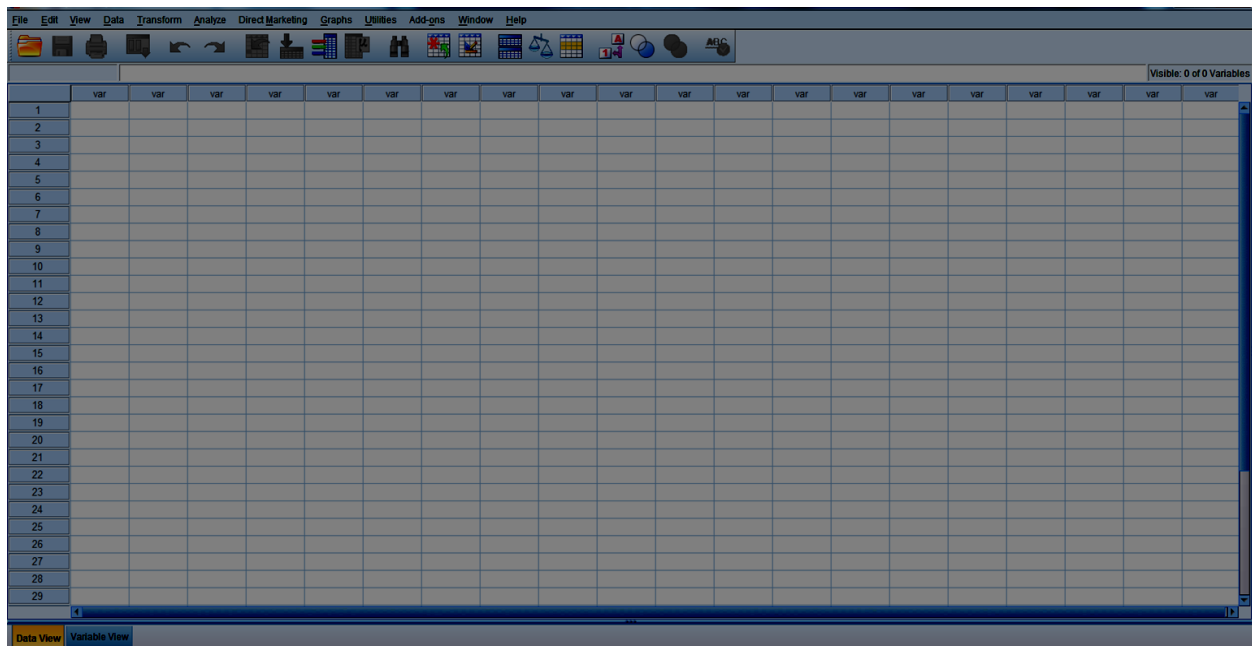
Values: Here, you can add labels to each response alternative. For example, for the variable Education level, "10th " is coded as 1, "+2" is coded as 2, "Ug" is coded as 3, and "Pg" is coded as 4. Through the option Values, you tell SPSS to label each number according to the correct response. Next to Value (below Value Labels), type in "1" and next to Label, type in "10th ". Then click Add. Next to Value (below Value Labels), type in "2" and next to Label, type in "+2". Then click Add, etc.



Missing: The missing values default to the coded will be a dot symbol "." for numerical variables or string variables, cells will be left blank in the data set.

2.5 Data View

Once the structure of the data set is determined, it is time to take a look at Data View. Access this view by clicking on the tab named Data View in the lower left corner.



Here, each column corresponds to a variable, whereas each row corresponds to a case (most commonly an individual). It is possible to change the order of the variables by highlighting a

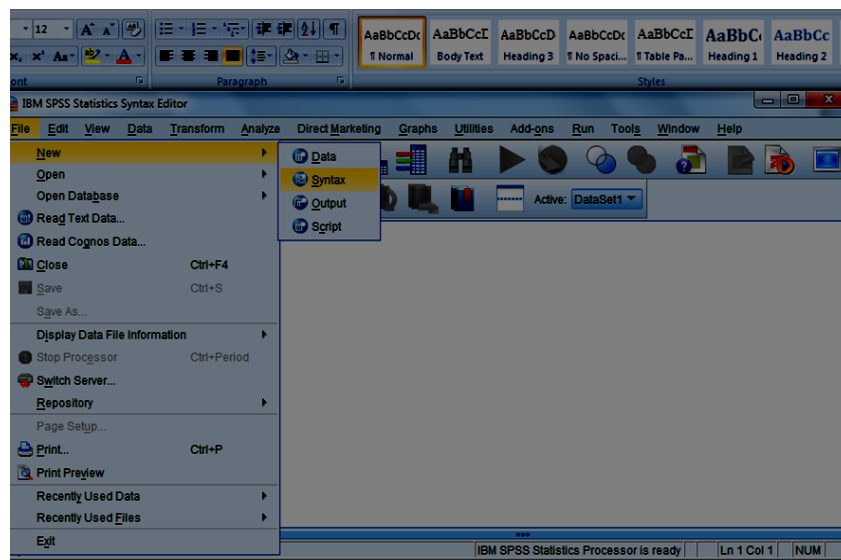
column and using "drag and drop". You may also change the width of the column by placing the mouse over the right border of a column (next to the name of the column), pressing down the button, and then "drag and drop" If you are creating a new data set, simply type in your data, one row (and one column) at a time. Use the left and right arrow keys on your keyboard to move between cells.

Make sure that you have chosen the right type of variable before you enter your data (i.e., Numeric or String).

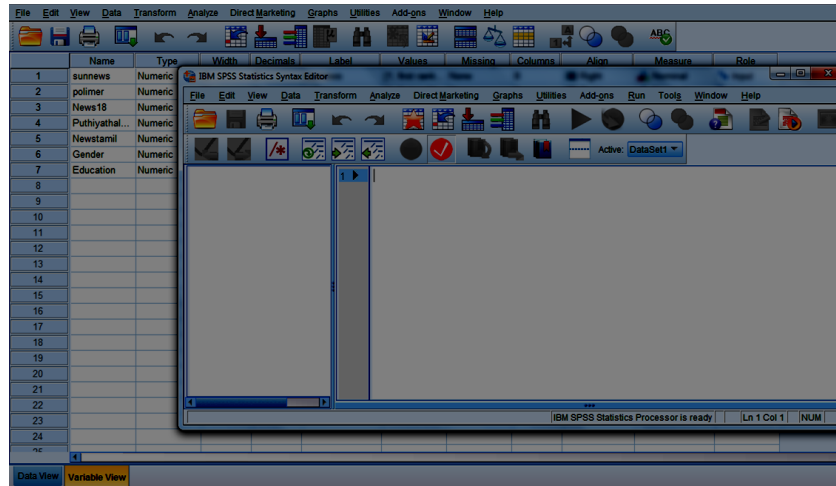
2.6 Syntax

The syntax is presented in a new window called **IBM SPSS Statistics Syntax Editor**. Note that the Menu bar is very similar to the one available through Data View and Variable View. In other words, you do not always have to go back to Data View or Variable View to access the Menu bar.

Step1:Go to File> Select New> Click Syntax



Step2:Syntax Editor file open



There are two text areas: the big one to the right is where all commands will be displayed. A command is basically when you tell SPSS that you want it to perform a specific test or analysis or to create a table or a graph. All these features have their commands. To the left, you will have a "short list" of the same commands.

How to Include a Command in the Syntax

There are two ways of including a command in the syntax:

1. Through the Menu System: For all features provided in the Menu bar, you will have a button called Paste. If you click on this button, the correct command will be pasted into the syntax you currently have open. If you have several syntax windows open, make sure that the command is pasted into the correct one.
2. Writing the Command Yourself: If you have never used SPSS syntax before, this is not recommended in the beginning. However, once you have created a "stock" of commands using Paste, you may start re-using these commands by copying, pasting, and then altering them directly in your syntax. When you write your commands in the syntax, the functions will have different colors. The command will be red if it is not written properly.

Examples

* This is a frequency table of gender.

* Linear regression analysis of educational level (independent variable) and income (dependent variable).

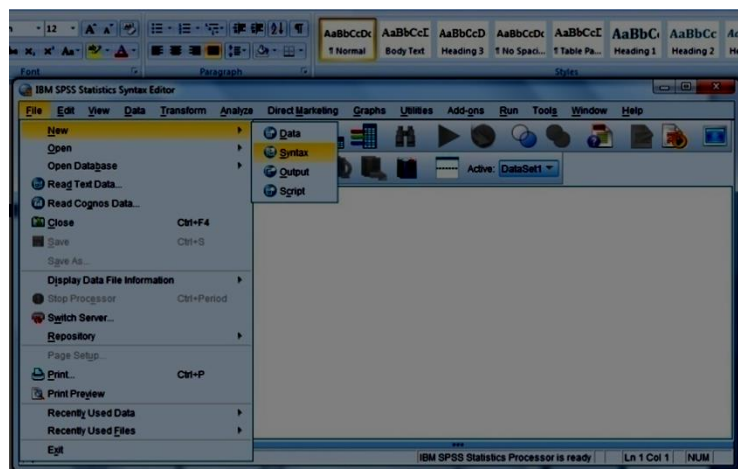
How to Execute the Command

To execute the command, highlight all the rows for that specific command and press the big green arrow below the Menu bar in the syntax window. You do not have to highlight one command at a time—it is possible to execute several commands at once. If you have added comments to your syntax, make sure that they are grey (i.e., inactive); SPSS will take them for (faulty) commands.

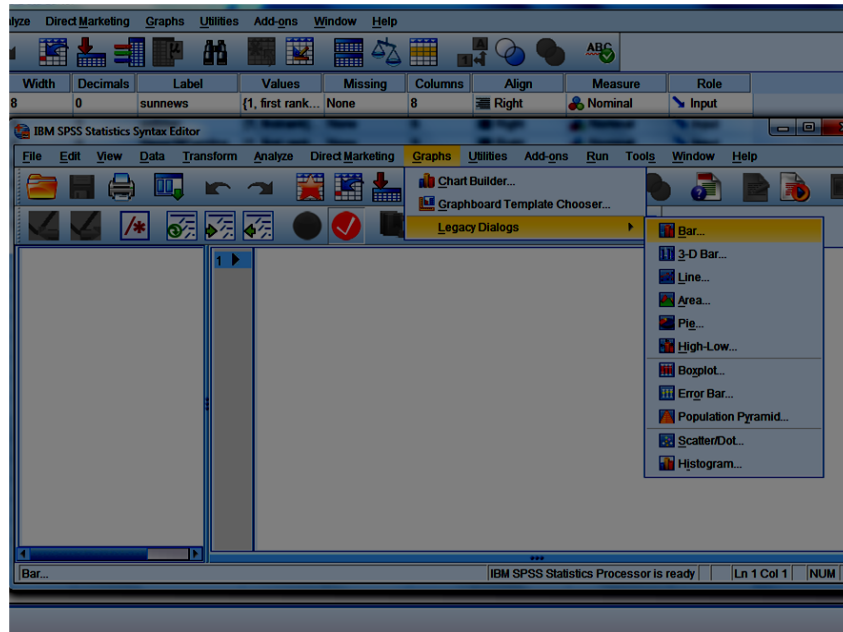
2.7 Output

Everything you order in SPSS (e.g., graphs, tables, or analyses) ends up in a window called Output. In the area to the left, all the different steps are listed. It is possible to collapse specific steps by clicking on the box with the minus sign (and expand it again by clicking on the same box, now with a plus sign). In the area to the right, your actual output is shown. First, you see the syntax for what you have ordered, and then you get the tables or graphs related to the specific command.

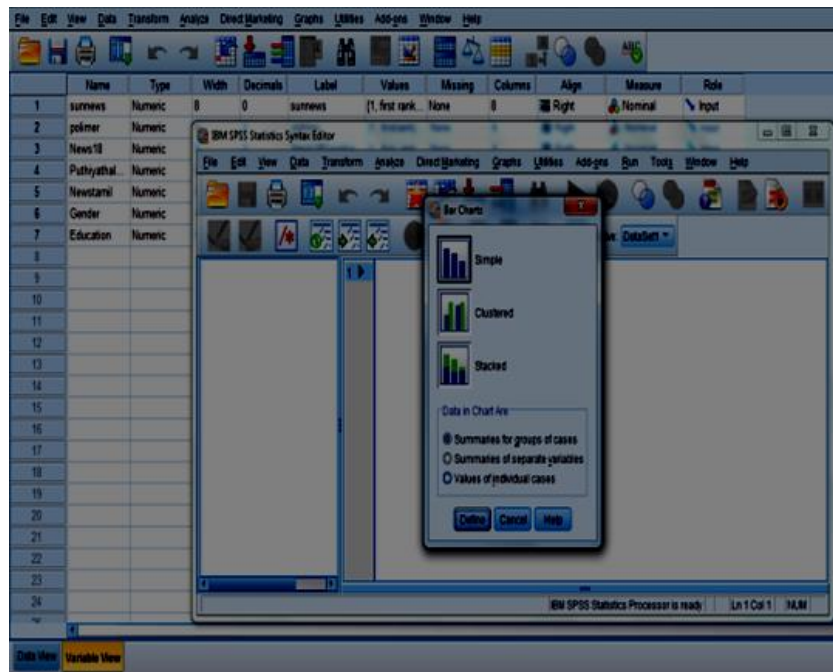
Step1:Go to File> Select New> Click Syntax



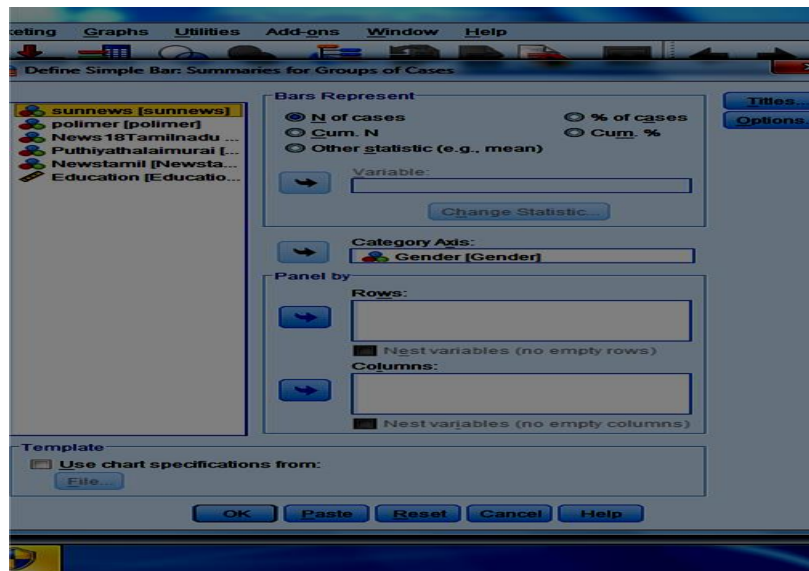
Step2: Choose Graphs> Select Legacy Dialogs> Click Bar chart



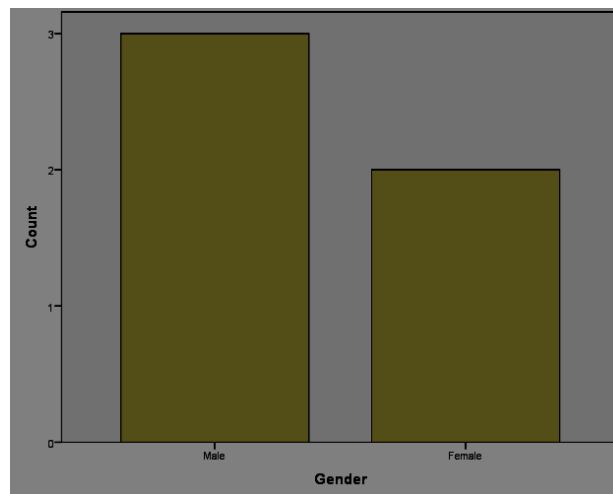
Step3: Choose Bar charts >Click Simple option



Step 4: Choose Simple >Simple Bar window display>choose category Axis Gender



Step 5: Simple graphs will be displayed



Multiple-Choice Questions (MCQs) on SPSS:

1. SPSS stands for:
 - a) Statistical Package for Social Sciences
 - b) Statistical Program for Social Studies
 - c) Social Package for Statistical Science
 - d) Statistical Processing Software SystemAnswer: a) Statistical Package for Social Sciences
2. SPSS is mainly used for:
 - a) Writing programs
 - b) Data analysis
 - c) Drawing pictures
 - d) Web designingAnswer: b) Data analysis
3. SPSS is widely used in:
 - a) Social science research
 - b) Engineering only
 - c) Agriculture only
 - d) Medicine onlyAnswer: a) Social science research
4. In SPSS, data are entered in:
 - a) Rows and columns
 - b) Pictures
 - c) Charts only
 - d) DiagramsAnswer: a) Rows and columns
5. The two main views in SPSS are:
 - a) File view and Edit view
 - b) Data view and Variable view
 - c) Table view and Graph view

d) Text view and Chart view

Answer: b) Data view and Variable view

6. Each column in SPSS Data View represents a:

a) Variable

b) Case

c) Report

d) Graph

Answer: a) Variable

7. Each row in SPSS Data View represents a:

a) Variable

b) Case or respondent

c) Chart

d) Label

Answer: b) Case or respondent

8. SPSS is developed by:

a) Microsoft

b) IBM

c) Google

d) Oracle Answer: b) IBM

9. Which of the following is used to perform statistical tests in SPSS?

a) Analyse menu

b) File menu

c) Edit menu

d) View menu Answer: a) Analyze menu

10. SPSS output results are shown in:

a) Output window

b) Data window

c) Variable window ,

d) Chart window

Answer: a) Output window

CHAPTER III

3.1 INTRODUCTION TO DESCRIPTIVE ANALYSIS

Descriptive analysis is a statistical method used to summarize and describe the main features of a dataset. It helps researchers understand data by organizing, presenting, and interpreting information in a meaningful way.

In research and business studies, descriptive analysis is used to present data in the form of tables, charts, graphs, percentages, averages, and frequencies so that the data can be easily understood. It does not explain why something happens but describes what the data shows.

Benefits of Descriptive Analysis

1. Simplifies Complex Data – It converts large amounts of data into simple summaries.
2. Better Understanding of Data – Helps researchers easily interpret and understand the data.
3. Supports Decision Making – Provides useful information for making business or research decisions.
4. Identifies Patterns and Trends – Helps to find patterns, relationships, and trends in the data.
5. Easy Presentation – Data can be clearly presented using charts, graphs, and tables.
6. Foundation for Further Analysis – It serves as the first step before advanced statistical analysis.

3.2 Tools Used in Descriptive Analysis

1. Frequency Distribution – Shows how often each value appears.
2. Percentage Analysis – Represents data in percentage form.
3. Weighted Average Method – A method used to calculate an average by giving different weights or importance to each value.
4. Mean Score Analysis – A statistical method used to find the average score of responses to interpret survey data.

5. Garrett Ranking – A technique used to convert ranks given by respondents into scores to determine the overall ranking of factors.
6. Standard Deviation – Measures how spread out the data is.

Key Points to Remember

- ✓ Descriptive analysis summarizes and organizes data.
- ✓ It is the first step in statistical data analysis.
- ✓ It focuses on what happened in the data, not why it happened.
- ✓ It uses statistical measures like mean, median, and mode.
- ✓ It helps in the clear presentation and interpretation of data.
- ✓ It is widely used in research, business, economics, and social sciences.

Purpose of Descriptive Analysis

The purpose of descriptive analysis is to summarize, organize, and present data in a meaningful way so that it becomes easier to understand and interpret.

Main purposes include:

1. To summarize large amounts of data in a simple and clear form.
2. To describe the main characteristics of the dataset using measures like mean, median, and standard deviation.
3. To identify patterns and trends in the data.
4. To present data using tables, charts, and graphs for better understanding.
5. To support decision-making in research and business analysis.

Multiple-choice questions (MCQs) based on descriptive statistics:

1. Which of the following is NOT a measure of central tendency?

- A) Mean
- B) Median
- C) Mode
- D) Variance

Answer: D) Variance

2. What is the correct formula for the mean of a dataset?

- A) $\sum(X-\mu)N\frac{\sum\{(X - \mu)\}}{N}N\sum(X-\mu)$
- B) $\sum XN\frac{\sum\{X\}}{N}N\sum X$
- C) $\sum(X-\mu)^2N\frac{\sum\{(X - \mu)^2\}}{N}N\sum(X-\mu)^2$
- D) $\sum X^2N\frac{\sum\{X\}}{2N}2N\sum X$

Answer: B) $\sum XN\frac{\sum\{X\}}{N}N\sum X$

3. The median is defined as:

- A) The average of the two middle numbers in an ordered dataset
- B) The number that appears most frequently in a dataset
- C) The difference between the highest and lowest values
- D) The sum of all values divided by the total number of values

Answer: A) The average of the two middle numbers in an ordered dataset

4. Which of the following is an example of a skewed distribution?

- A) Normal distribution
- B) Uniform distribution
- C) Exponential distribution
- D) Binomial distribution

Answer: C) Exponential distribution

5. The range of a dataset is defined as:

- A) The sum of all values divided by the number of values
- B) The difference between the maximum and minimum values
- C) The average of the squared deviations
- D) The frequency of the most common value

Answer: B) The difference between the maximum and minimum values

6. What does the standard deviation measure in a dataset?

- A) The relationship between the variables
- B) The spread or dispersion of the data
- C) The central value of the data
- D) The total number of data points

Answer: B) The spread or dispersion of the data

7. If a dataset has a mean of 50 and a standard deviation of 10, which of the following is true for a data point of 70?

- A) The data point is one standard deviation above the mean
- B) The data point is two standard deviations above the mean
- C) The data point is two standard deviations below the mean
- D) The data point is one standard deviation below the mean

Answer: B) The data point is two standard deviations above the mean

8. Which of the following is the most appropriate measure of central tendency for a dataset with extreme outliers?

- A) Mean
- B) Median
- C) Mode
- D) Range

Answer: B) Median

9. A dataset has the following values: 3, 5, 7, 5, 3, 3, 8, 4. What is the mode of this dataset?

- A) 3
 - B) 5
 - C) 4
 - D) 7
- Answer: A) 3

10. What does the interquartile range (IQR) represent?

- A) The range between the largest and smallest values in the dataset
- B) The range between the mean and median
- C) The range between the first and third quartiles
- D) The difference between the median and mode

Answer: C) The range between the first and third quartiles

CHAPTER IV

4.1 FREQUENCY DISTRIBUTION

Meaning:

A frequency distribution is a statistical method used to organize data into categories or classes and show how many times each value occurs.

Importance of Frequency Distribution

1. Organizes Data – It arranges large amounts of data in a systematic form.
2. Easy Understanding – Helps researchers easily understand and interpret data.
3. Shows Pattern of Data – Displays how frequently each value appears.
4. Useful for Analysis – Helps in further statistical analysis like mean, median, and mode.
5. Better Presentation – Data can be clearly presented using tables, charts, and graphs.

Question1:

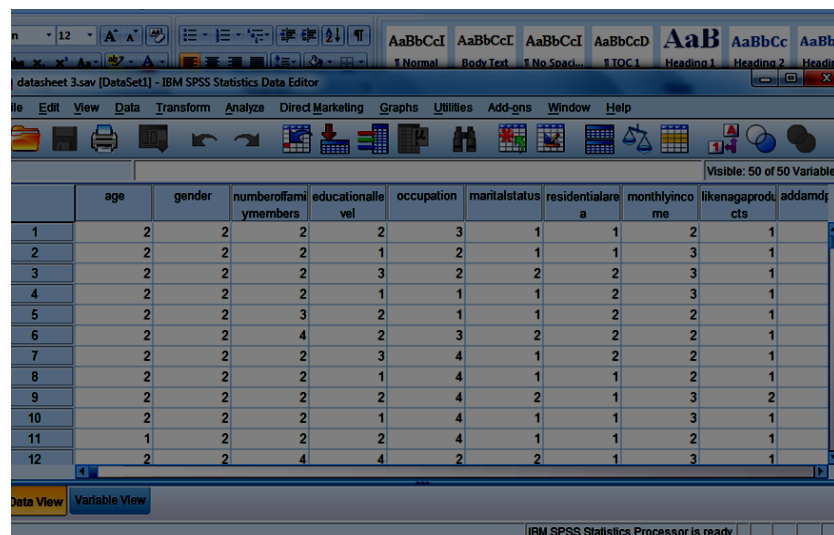
1. **Do you like to cook NAGA products?**

Yes

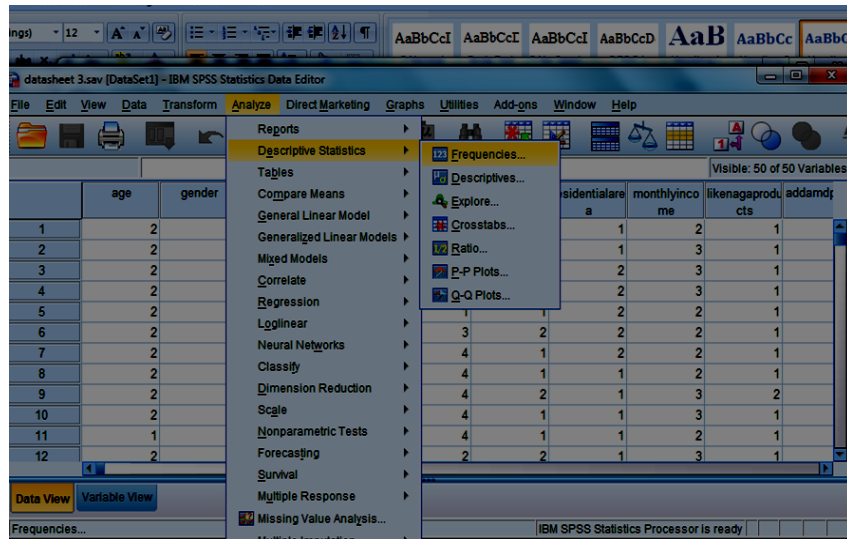
No

Algorithm / Steps for Frequency in SPSS

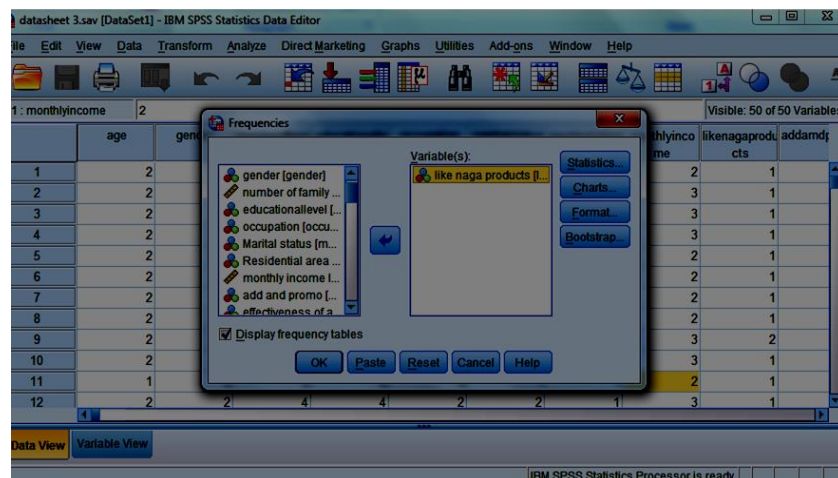
1. Open the Data File
Enter or open your dataset in SPSS using Variable View and Data View.



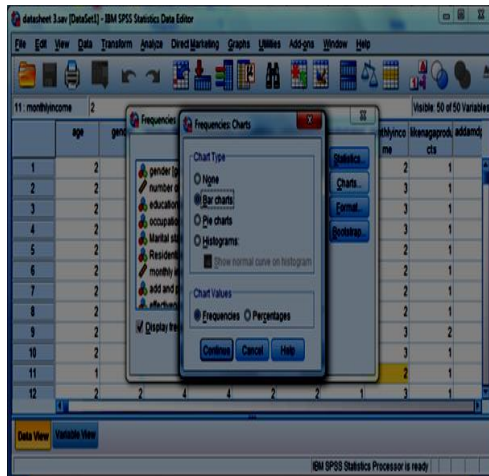
2. Select the Analyze Menu
Click Analyze → Descriptive Statistics → Frequencies.



3. Choose the Variable
Move the variable you want to analyze (example: **Do you like to cook NAGA products?**) into the Variable(s) box.



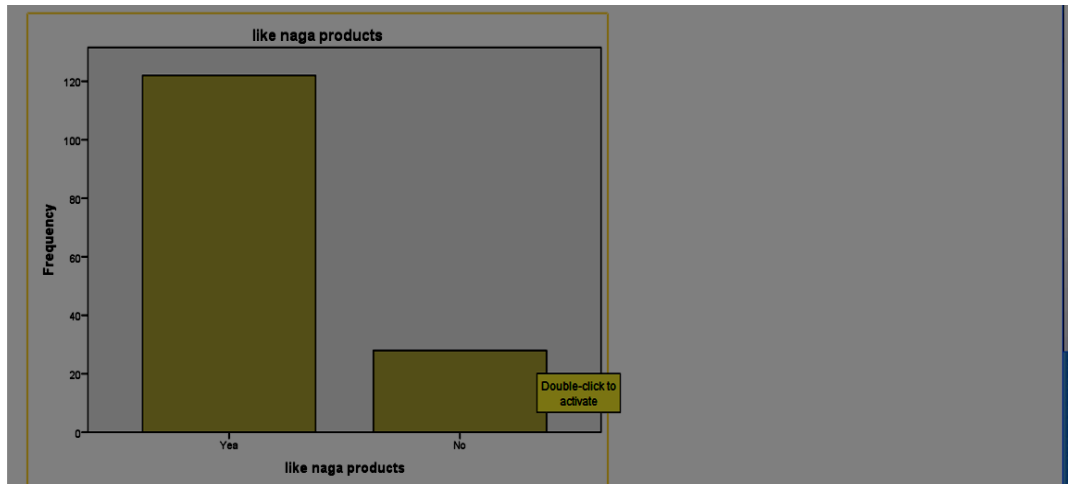
4. Select Charts
Click Charts -> Bar Chart



5. Run the Analysis
Click OK. SPSS will generate a frequency table showing counts, percentages, valid percentages, and cumulative percentages.

Result Output

Valid	yes
	No
	Total



Interpretation

The table shows that 122 respondents out of 150 answered “Yes”, indicating that the majority of respondents support or agree with the given statement. Only 28 respondents answered “No”, which represents a smaller portion of the sample.

Inference

It can be inferred that most respondents have a positive response or acceptance toward the subject of the study, while only a few respondents expressed disagreement.

Frequency Distribution – Multiple Objective Questions (MCQs)

1. Frequency distribution refers to:

- a) A method of calculating mean
- b) A table showing how data values occur with their frequencies
- c) A graphical representation of data
- d) A method of collecting data Answer: b

2. The number of times a particular value occurs in a dataset is called:

- a) Mean
- b) Frequency
- c) Median
- d) Rang Answer: b

3. Frequency distribution is mainly used to:

- a) Organize and summarize data
- b) Increase sample size
- c) Calculate profit
- d) Predict future trends Answer: a

4. When data is grouped into class intervals, it is called:

- a) Ungrouped frequency distribution
- b) Grouped frequency distribution
- c) Cumulative frequency distribution
- d) Relative frequency distribution Answer: b

5. The running total of frequencies is called:

- a) Simple frequency
- b) Relative frequency
- c) Cumulative frequency
- d) Total frequency Answer: c

6. The difference between the highest and lowest value in a dataset is called:

- a) Range
- b) Mean
- c) Mode
- d) Median

Answer: a

7. A diagram used to represent frequency distribution is:

- a) Histogram
- b) Pie chart
- c) Scatter diagram
- d) Line graph

Answer: a

8. Relative frequency is obtained by:

- a) Dividing the class interval by total data
- b) Dividing frequency by total number of observations
- c) Multiplying frequency by class width
- d) Adding all frequencies

Answer: b

9. Which of the following is an example of a frequency distribution table?

- a) A list of numbers
- b) A table showing class intervals and their frequencies
- c) A bar diagram
- d) A line chart

Answer: b

10. Frequency distribution helps researchers to:

- a) Make data more complicated
- b) Understand patterns and trends in data
- c) Increase the number of variables
- d) Eliminate data values

Answer: b

4.2 PERCENTAGE ANALYSIS

Meaning:

Percentage analysis is a statistical method used to express data in the form of percentages to make comparison and interpretation easier.

Importance of Percentage Analysis

1. Easy Understanding – Converts data into percentages, making it simple to understand.
2. Better Comparison – Helps compare different groups or categories easily.
3. Clear Presentation – Data can be clearly presented in tables, charts, and graphs.
4. Useful in Research – Widely used in surveys, research studies, and business analysis.
5. Supports Decision Making – Helps researchers and managers make better decisions based on percentage results.

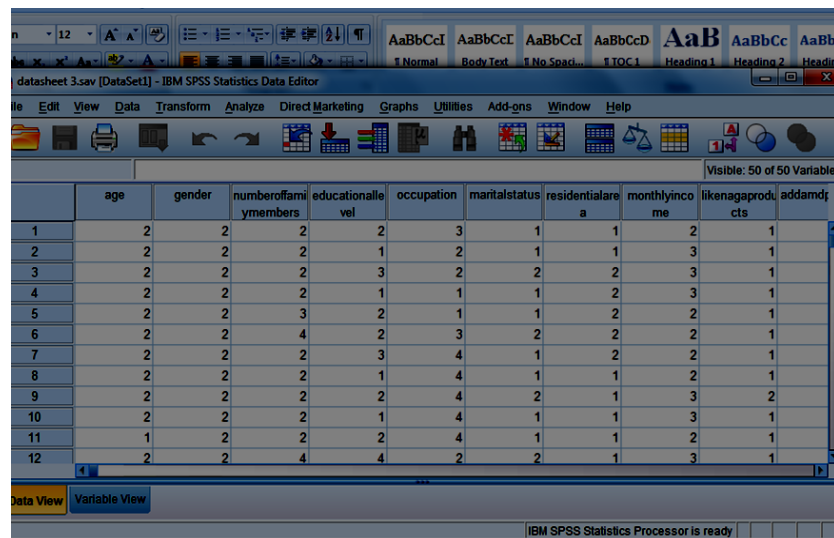
Question1:

1. **Age:**

Below 20	21-25	26-35	36-45
46 and above			

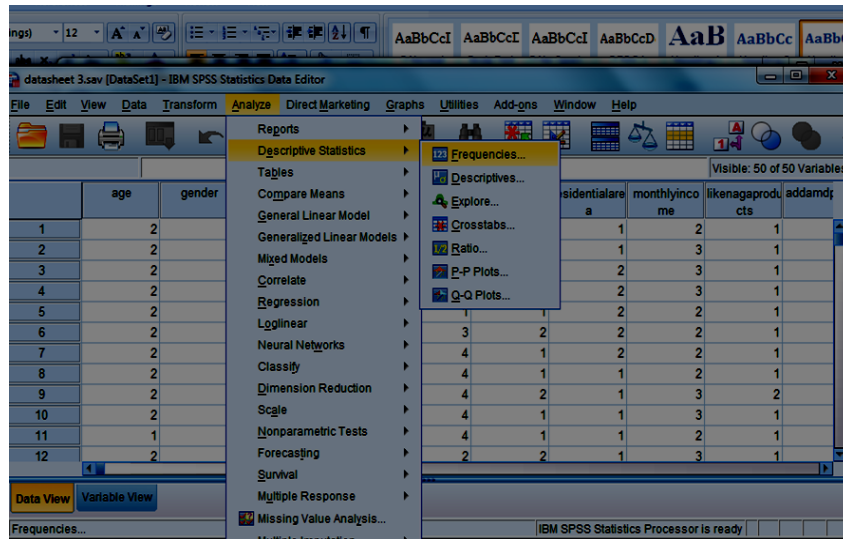
Algorithm / Steps for Frequency in SPSS

1. Open the Data File
Enter or open your dataset in SPSS using Variable View and Data View.



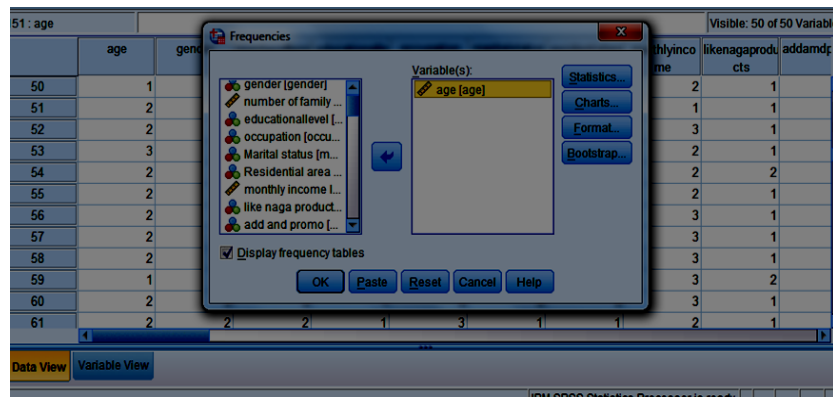
2. Select the Analyze Menu

Click Analyze → Descriptive Statistics → Frequencies.



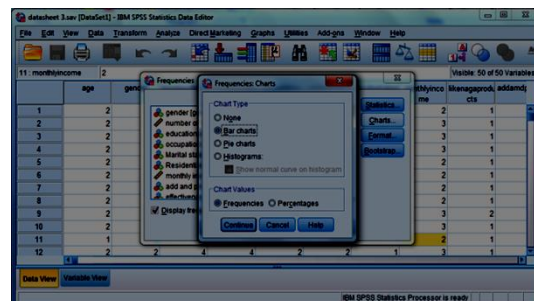
3. Choose the Variable

Move the variable you want to analyze (example: **AGE**) into the Variable(s) box.



4. Select Charts

Click Charts -> Pie Chart.



5. Run the Analysis

Click OK. SPSS will generate a frequency table showing counts, percentages, valid percentages, and cumulative percentages.

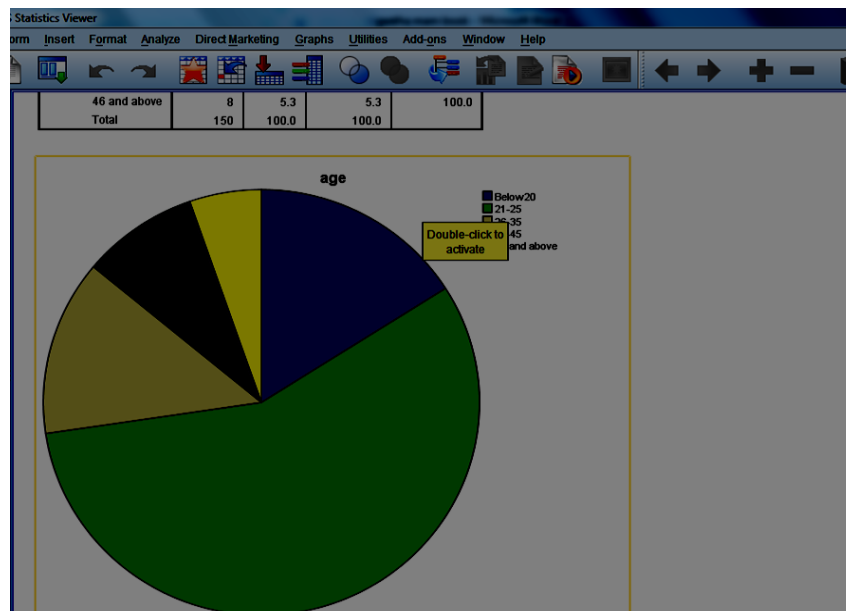
		Frequency
Valid	Below20	24
	21-25	85
	26-35	20
	36-45	13
	46 and above	8
Total		150

Interpretation

The table shows that the majority of respondents 85 (56.7%) belong to the 21–25 years age group, indicating that most participants in the study are young adults. Respondents below 20 years account for 24 (16%), while the 26–35 years group represents 20 (13.3%), and the remaining age groups have comparatively fewer respondents.

Inference

It can be inferred that the study sample is largely dominated by younger individuals, particularly those aged 21–25 years, while participation from older age groups (36 years and above) is relatively low.



Percentage Analysis – Multiple Choice Questions (Basic)

1. Percentage analysis is used to:

- a) Find the average
- b) Express data in terms of percentages
- c) Calculate standard deviation
- d) Measure variance

Answer: b

2. Percentage means:

- a) Per hundred
- b) Per ten
- c) Per thousand
- d) Per unit

Answer: a

3. The formula for percentage is:

- a) $\text{Value} / \text{Total} \times 100$
- b) $\text{Total} / \text{Value} \times 100$
- c) $\text{Value} \times \text{Total} / 100$
- d) $\text{Total} \times 100$

Answer: a

4. Percentage analysis helps to:

- a) Compare data easily
- b) Increase sample size
- c) Remove data
- d) Change variables

Answer: a

5. Percentage analysis is commonly used in:

- a) Business and research reports
- b) Cooking recipes
- c) Sports games
- d) Painting

Answer: a

6.If 25 out of 100 students are boys, the percentage of boys is:

- a) 20%
- b) 25%
- c) 30%
- d) 40%

Answer: b

7. If 40 out of 200 respondents prefer a product, the percentage is:

- a) 10%
- b) 20%
- c) 30%
- d) 40%

Answer: b

8. Percentage analysis is useful for:

- a) Data comparison
- b) Data deletion
- c) Data multiplication
- d) Data duplication

Answer: a

9. In percentage analysis, the total value is usually taken as:

- a) 10
- b) 50
- c) 100
- d) 1000

Answer: c

10. Percentage analysis is mainly a part of:

- a) Descriptive statistics
- b) Inferential statistics
- c) Algebra
- d) Geometry

Answer: a

4.3 MEAN, MEDIAN , STANDARD DEVIATION

4.3 MEAN (AVERAGE)

Meaning:

Mean is the sum of all values divided by the total number of observations.

Importance:

- Shows the overall average value of the dataset.
- Helps researchers understand the general trend of the data.
- Widely used in business, economics, and research analysis.

4.4 . MEDIAN

Meaning:

Median is the middle value of the data when arranged in ascending or descending order.

Importance:

- Useful when data contains extreme values (outliers).
- Shows the central position of the dataset.
- Commonly used in income, salary, and demographic studies.

4.5 MODE

Meaning:

Mode is the value that occurs most frequently in a dataset.

Importance:

- Helps identify the most common or popular response.
- Useful in market research and consumer preference studies.
- Suitable for categorical data analysis.

4.6 STANDARD DEVIATION

Meaning:

Standard deviation measures the amount of variation or dispersion of data from the mean.

Importance:

- Shows how spread out the data values are.
- A low value indicates data is close to the mean, while a high value indicates more variation.
- Important for data consistency and reliability analysis in research.

Question: The following table gives the number of workers and the working time to complete a particular task. Calculate mean, median, mode, standard deviation, skewness and kurtosis.

Number of workers	18	20	24	35	42	48	50
working time	2	4	3	8	6	4	3

Aim:

To calculate mean, median, mode, standard deviation and efficient of skewness and kurtosis-discrete series.

Algorithm:

- Step 1** Name the variables in Variable View and enter data in Data View.
- Step 2** Click Data in the main menu, select Weight Cases.
- Step 3** Select weight cases by radio button under Weight cases.
- Step 4** Transfer the number of workers to the Frequency Variable, and then click OK. Now the display disappears from the screen.
- Step 5** Choose Analyse from the main menu. Click Descriptive Statistics and select Frequencies.

- Step 6** The Frequencies dialogue box appears. Transfer the variable Number of time into the Variable(s): box. Check the display Number of time under the Variable(s): box.
- Step 7** Click Statistics to open the Frequencies: Statistics dialogue box and select mean, median and mode under Central Tendency. Standard deviation and SE mean under Dispersion. Skewness and kurtosis under Distribution.
- Step 8** Then click Continue, and then click OK to run the analysis.
- Step 9** The output appears with descriptive statistics like mean, median and mode, mean, skewness and kurtosis.

Output:

Workers	Time	var	var	v
18	2			
20	4			
24	3			
35	8			
42	6			
48	4			
50	3			

Name	Type	Width	Decimals	Label	Values	Missing	Columns	Align	Measure	Role
Workers	Numeric	8	0	Workers of the company	None	None	8	Right	Scale	Input
Time	Numeric	8	0	Working time for Worker	None	None	8	Right	Scale	Input

Frequencies

[DataSet0]

Statistics

		Workers of the company	Working time for Worker
N	Valid	7	7
	Missing	0	0
Mean		33.86	4.29
Median		35.00	4.00
Mode		18 ^a	3 ^a
Std. Deviation		13.347	2.059
Variance		178.143	4.238
Skewness		-.003	1.071
Std. Error of Skewness		.794	.794
Kurtosis		-2.138	.621
Std. Error of Kurtosis		1.587	1.587
Range		32	6

a. Multiple modes exist. The smallest value is shown

Interpretation

The analysis shows that the average number of workers is 33.86, indicating moderate variation among companies. The average working time for workers is 4.29, with most workers having around 3–4 units of working time. Overall, the data indicate moderate variability and a slightly positive skew in working time distribution

Mean, Median, Mode, and Standard Deviation – Basic MCQs (10 Questions)

1. The average of a set of values is called:

- a) Median
- b) Mode
- c) Mean
- d) Range

Answer: c

2. The middle value in an ordered dataset is called:

- a) Mean
- b) Median
- c) Mode
- d) Variance

Answer: b

3. The value that occurs most frequently in a dataset is called:

- a) Mean
- b) Median
- c) Mode
- d) Standard deviation

Answer: c

4. Standard deviation measures:

- a) Central value
- b) Data frequency
- c) Dispersion of data
- d) Data collection

Answer: c

5. Mean is calculated by:

- a) Multiplying all values
- b) Adding all values and dividing by the number of observations
- c) Subtracting values
- d) Dividing highest value by lowest value

Answer: b

6. Median is useful when:

- a) Data contains extreme values
- b) Data is small
- c) Data is equal
- d) Data is grouped

Answer: a

7. Mode is mainly used to identify:

- a) Average value
- b) Most common value
- c) Lowest value
- d) Middle value

Answer: b

8. If the standard deviation is small, it means:

- a) Data values are widely spread
- b) Data values are close to the mean
- c) Data values are negative
- d) Data values are unequal

Answer: b

9. Which of the following is a measure of central tendency?

- a) Standard deviation
- b) Mean
- c) Variance
- d) Range

Answer: b

10. Mean, median, and mode are used to:

- a) Measure central tendency of data
- b) Measure variability
- c) Measure probability
- d) Measure correlation

Answer: a

4.7 MEAN SCORE ANALYSIS:

Meaning:

Mean Score Analysis is a statistical method used to calculate the average score of responses to understand the overall opinion or level of agreement of respondents.

Importance of Mean Score Analysis

1. Summarizes Data – Converts many responses into a single average value.
2. Easy Interpretation – Helps researchers easily understand respondents' opinions.
3. Useful in Surveys – Widely used in questionnaire and Likert scale analysis.
4. Helps in Comparison – Allows comparison between different factors or variables.
5. Supports Decision Making – Provides clear results for research conclusions.

Level of usage on the GVN college website.

Table 3

S. No	PARTICULAR	Strongly agree	Agree	Neutral	Strongly disagree	Disagree
1	Using website for searching the academic syllabus	33	30	10	25	2
2	Using website to pay the examination/College fees	44	20	12	14	10
3	Using the website for studying the previous question papers	54	25	2	9	10
4	Using the website for searching the Internal results and Semester results	65	20	2	8	5
5	Using the website for gathering the student Mentor details	5	7	3	60	25
6	Using the website for gathering News and events	2	9	4	19	66

Source: Primary data

	TOTAL	MEAN SCORE
1. $(33*5) + (30*4) + (10*3) + (25*2) + (2*1)$	= 367	0.611
2. $(44*5) + (20*4) + (12*3) + (14*2) + (10*1)$	= 374	0.623
3. $(54*5) + (25*4) + (2*3) + (9*2) + (10*1)$	= 404	0.673
4. $(65*5) + (20*4) + (2*3) + (8*2) + (5*1)$	= 432	0.720
5. $(5*5) + (7*4) + (3*3) + (60*2) + (25*1)$	= 207	0.345
6. $(2*5) + (9*4) + (4*3) + (19*2) + (66*1)$	= 162	0.270

		3.242

$$\text{MEAN SCORE} = 1946 / (6 * 100) = 3.242$$

Interpretation

From the above analysis, it is clear that the variable " Using the website for searching the Internal results Semester results " carries the highest mean score of (0.720), followed by " Using the website for studying the previous question papers " with (0.673), which made the respondents to the Level of usage in GVN college website.

Mean Score Analysis – Basic Multiple-Choice Questions (10 MCQs)

1. Mean score analysis is used to:

- a) Find the average value of responses
- b) Find the highest value
- c) Find the lowest value
- d) Find the frequency

Answer: a

2. The mean score is calculated by:

- a) Adding all values and dividing by the number of observations
- b) Multiplying all values
- c) Subtracting values
- d) Dividing the highest value by the lowest value

Answer: a

3. Mean score analysis is mainly used in:

- a) Survey research
- b) Cooking
- c) Drawing
- d) Painting

Answer: a

4. In mean score analysis, the mean represents:

- a) The middle value
- b) The most frequent value
- c) The average value
- d) The lowest value

Answer: c

5. Mean score analysis helps researchers to:

- a) Compare different variables
- b) Delete data
- c) Increase data
- d) Change data

Answer: a

6. If the mean score is high, it indicates:

- a) Low-level response
- b) High-level response
- c) No response
- d) Negative response

Answer: b

7. Mean score analysis is commonly used in:

- a) Customer satisfaction studies
- b) Weather reports
- c) Sports scoring
- d) Music analysis

Answer: a

8. Mean score analysis belongs to:

- a) Descriptive statistics
- b) Inferential statistics
- c) Algebra
- d) Geometry

Answer: a

9. The symbol commonly used for mean is:

- a) $\bar{X}$
- b) Y
- c) Z
- d) P

Answer: a

10. Mean score analysis helps to:

- a) Summarize survey results
- b) Remove data
- c) Create variables
- d) Change frequencies

Answer: a

4.8 GARRETT RANKING:

Garrett Ranking is a statistical technique used to convert the ranks given by respondents into scores in order to determine the most important factor.

Importance of Garrett Ranking

1. Converts Ranks into Scores – Helps transform ranking data into numerical values for analysis.
2. Identifies Priority Factors – Helps determine the most important problem or factor among many.
3. Easy Comparison – Makes comparison between different factors easier.
4. Useful in Research Studies – Widely used in surveys and research analysis.
5. Provides Accurate Results – Gives reliable results for ranking preferences or opinions.

Questions1:

An attempt has been made to analyse the respondents' preference for the use of the kind of Johnson and Johnson products by the Garrett ranking method. The respondents were requested to rate five types of Baby oil, Baby powders, Soap, Baby lotion and creams, and Baby gift pack of Johnson and Johnson products. Garrett's ranking technique was used in ascertaining the respondents' ranks for different kinds of Johnson and Johnson products.

STEP 1:

Getting ranks for the different kinds of Johnson and Johnson products.

RANKING OF RESPONDENTS' ranks for Johnson and Johnson products.

S.NO	Kind of product	RANK				
		1	2	3	4	5
1	Baby oil	32*75	35*60	24*50	45*40	14*25
2	Baby powders	55	50	23	13	9
3	Soap	9	14	36	21	70
4	Baby lotion and creams	13	36	22	45	34
5	Baby gift pack	42	17	44	25	22

Source:Primary data

STEP 2:

The assigned ranks by respondents were converted into a percent position value by the formula given below. For each per cent position, using Garrett's table, the corresponding Garrett's table value is obtained.

Formula

$$\text{Per cent position} = 100(R_{ij} - 0.5)/N_j$$

R_{ij} = rank given for the i variable by the j respondent

N_j = Number of variables ranked by the j respondent

GARRETT'S TABLE VALUE

RANKS	Calculation	Percentage	GARRETT'S TABLE VALUE
1 RANK	$=100*(1-0.5)/5$	=10	75
2 RANK	$=100*(2-0.5)/5$	=30	60
3 RANK	$=100*(3-0.5)/5$	=50	50
4 RANK	$=100*(4-0.5)/5$	=70	40
5 RANK	$=100*(5-0.5)/5$	=90	25

STEP 3:

Scores are obtained with reference to Garrett's Table value, and each percentage position Garrett's value obtained in the table.

Particulars of the Garrett Score

S.NO	Factors	RANK				
		1	2	3	4	5
1	Baby oil	2400	2100	1200	1800	350
2	Baby powders	2625	2100	1200	1800	205
3	Soap	675	3000	1150	520	560
4	Baby lotion and creams	975	840	1800	840	2430
5	Baby gift pack	3150	1020	2200	1000	550

STEP 4:

Summation of the scores is worked out for each rank column and means scores calculated by dividing the total score by the number of the respondents.

Finally, overall ranking is obtained by assigning rank 1, 2,3,4,5 in the descending order of mean score

OVERALL RANK FOR the kind of baby care products of Johnson and Johnson .

S.NO	Product item	Total score	Average	Rank
1	Baby oil	7850 (2400+2100 +1200+1800 +350)	52 7850/150	2
2	Baby powder	7520	50	3
3	Soap	5905	39	5
4	Baby lotion and creams	6885	46	4
5	Baby gift pack	7920	53	1

Source :Primary data

It is observed from the above analysis that respondents ranked first for the baby gift pack, followed by Baby Oil, Baby powder, Baby Lotion and creams and Baby Soap.

Garrett Ranking Method – Multiple Choice Questions (10 MCQs)

1. The Garrett Ranking method is mainly used to:

- a) Measure correlation
- b) Convert ranks into scores
- c) Calculate mean
- d) Find standard deviation

Answer: b

2. The Garrett Ranking technique is commonly used in:

- a) Survey analysis
- b) Geometry
- c) Physics
- d) Chemistry

Answer: a

3. In Garrett Ranking, respondents are asked to:

- a) Give percentages
- b) Arrange factors in order of preference
- c) Calculate averages
- d) Find the median

Answer: b

4. The Garrett Ranking method helps to:

- a) Identify the most important factor
- b) Remove data
- c) Increase sample size
- d) Calculate frequency

Answer: a

5. The formula used in the Garrett Ranking is:

- a) $\text{Percent Position} = 100 (R_{ij} - 0.5) / N_j$

- b) $\text{Mean} = \Sigma X / N$
- c) $\text{Percentage} = \text{Value} / \text{Total} \times 100$
- d) $\text{Range} = \text{Highest} - \text{Lowest}$

Answer: a

6. In the Garrett Ranking formula, R_{ij} represents:

- a) Total respondents
- b) Rank given for the factor
- c) Mean value
- d) Standard deviation

Answer: b

7. In Garrett Ranking, N_j indicates:

- a) Total number of factors ranked by a respondent
- b) Mean score
- c) Percentage value
- d) Frequency

Answer: a

8. Garrett Ranking method converts:

- a) Scores into ranks
- b) Ranks into percentage scores
- c) Data into graphs
- d) Data into frequencies

Answer: b

9. Garrett Ranking is useful to:

- a) Identify preference order of factors
- b) Calculate mean deviation
- c) Find median value
- d) Determine variance

Answer: a

10. Garrett Ranking method is mainly used in:

- a) Marketing and social science research
- b) Astronomy
- c) Medicine
- d) Engineering

Answer: a

4.9 WEIGHTED AVERAGE METHOD:

Meaning:

The Weighted Average Method is a statistical technique used to calculate the average of a dataset where each value is assigned a specific weight according to its importance. Values with higher importance receive greater weight in the calculation.

Importance:

- It provides a more accurate average when different items have different levels of importance.
- It is widely used in business, economics, and research analysis.
- It helps in decision-making by giving priority to more significant factors.

WEIGHTED FACTORS
Convenience (24 hours)
Safe and Secure
No service charge
Easy to maintain my transaction activity
User friendliness

S.No	Rank	1	2	3	4	5	Total score	Weighted Average	Rank
	Weighted Factors	5	4	3	2	1			
1	Convenience (24 hours)	218	62	15	3	1	1395	93	I
2	Safe and Secure	62	186	31	12	9	1204	78.66	III
3	No service charge	-	-	-	18	282	318	21.2	V
4	Easy to maintain my transaction activity	110	142	-	48	-	1214	80.93	II
5	User friendliness	13	22	125	58	82	726	48.4	IV

Total no of Ranks: $5+4+3+2+1=15$

Convenience

$$218*5+62*4+15*3+3*2+1*1=1395/15=93$$

Safe and secure

$$62*5+186*4+31*3+12*2+9*1=1180/15=78.66$$

No service charge:

$$18*2+282*1=318/15=21.2$$

Easy to maintain my banking transaction activity

$$110*5+142*4+48*2=1214/15=80.93$$

User friendliness

$$13*5+22*4+125*3+58*2+82*1=726/15=48.4$$

Interpretation:

The weighted ranking analysis reveals that **Convenience** is the most influential factor for customers to use digital banking, with the highest weighted mean score of **93.00**. This is followed by **Easy to maintain banking transaction activity (80.93)** and **Safe and secure (78.66)**. **User friendliness** received a moderate score of **48.40**, while **No service charge (21.20)** ranked last. The findings indicate that customers primarily prefer digital banking because of its convenience, ease of transaction management, and security rather than the absence of service charges.

Weighted Average Method – Multiple Choice Questions (10 MCQs)

1. The Weighted Average Method is used to:

- a) Calculate simple average only
- b) Calculate average by giving different weights to values
- c) Count frequency
- d) Arrange data

Answer: b

2. In the Weighted Average Method, weight represents:

- a) Importance of each value
- b) Number of observations
- c) Frequency of data
- d) Range of data

Answer: a

3. The formula for weighted average is:

- a) $\Sigma X / N$
- b) $\Sigma WX / \Sigma W$
- c) $\Sigma X \times N$
- d) $\Sigma X - N$

Answer: b

4. Weighted average is commonly used in:

- a) Business and research analysis
- b) Painting
- c) Music composition
- d) Sports training

Answer: a

5. In the weighted average formula, W represents:

- a) Weight
- b) Value
- c) Mean
- d) Frequency

Answer: a

6. Weighted average gives:

- a) Equal importance to all values
- b) More importance to some values
- c) No importance to values
- d) Only frequency values

Answer: b

7. Which of the following is an example of weighted average?

- a) Average marks of students with subject credits
- b) Counting number of students
- c) Arranging data in order
- d) Drawing a graph

Answer: a

8. Weighted average method is useful for:

- a) Accurate decision making
- b) Deleting data
- c) Increasing variables
- d) Changing data types

Answer: a

9. If weights are not considered, the average becomes:

- a) Weighted average
- b) Simple average (mean)
- c) Median
- d) Mode

Answer: b

10. Weighted average method belongs to:

- a) Descriptive statistics
- b) Algebra
- c) Geometry
- d) Calculus

Answer: a

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ABOUT THE AUTHORS



I am Dr B. Kirubaharan,

an academician in Commerce – Business Analytics with over seventeen years of teaching and research experience at G. Venkataswamy Naidu College, Kovilpatti. I focus on creating an effective learning environment that supports academic and practical understanding. My expertise lies in Research Methodology, Statistical Analysis, and SPSS, along with several publications in reputed journals and conferences. This SPSS book reflects my effort to simplify statistical concepts for students and researchers while contributing to academic growth.



I am Dr J. Anand,

an academician in Commerce with experience in teaching, research, and student development as an Assistant Professor. I hold M.Com (CA), M.Phil., and Ph.D. qualifications, which strengthen my academic and research foundation. I am committed to continuous learning and contributing through teaching, publications, and academic activities. This CV highlights my education, experience, and achievements, reflecting my dedication to institutional growth and student success.



Dr.BGR
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