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MASTERING DESCRIPTIVE ANALYSIS IN SPSS:

FROM DATA TO INSIGHTS

*A Practical Guide to Understand,
Summarize and Interpret Your Data*



By
Dr. T. Suguna
Dr. A. Geethanjali

MASTERING DESCRIPTIVE ANALYSIS IN SPSS: FROM DATA TO INSIGHTS

Dr. T. Suguna

Assistant Professor of Management Studies

Virudhunagar Hindu Nadars' Senthikumara Nadar College (Autonomous)

Virudhunagar, Tamil Nadu.

Dr.A.Geethanjali

Head & Assistant Professor of Commerce

Sri Parasakthi College for women

Courtallam, Tenkasi District

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Author	Dr. T. Suguna Assistant Professor of Management Studies Virudhunagar Hindu Nadars' Senthikumara Nadar College (Autonomous) Virudhunagar, Tamil Nadu.
Co-Authors	Dr.A.Geethanjali Head & Assistant Professor of Commerce Sri Parasakthi College for women Courtallam, Tenkasi District
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PREFACE:

In today's research environment, data has become a powerful source of knowledge and decision-making. However, collecting data alone is not sufficient; the real value of research emerges through proper analysis, interpretation, and presentation of findings. Descriptive analysis plays a vital role in transforming raw data into meaningful information by summarizing, organizing, and understanding the characteristics of data.

“Mastering Descriptive Analysis in SPSS: From Data to Insights” is designed to provide a clear and practical understanding of descriptive statistical techniques using the Statistical Package for the Social Sciences (SPSS). This book serves as a guide for students, researchers, academicians, and professionals who wish to develop their skills in data analysis and interpretation.

The book begins with the fundamentals of SPSS, including the SPSS environment, data entry, variable creation, and basic functions. It then explains important descriptive analysis techniques such as frequency distribution, percentage analysis, mean, median, mode, standard deviation, coefficient of skewness, kurtosis, mean score analysis, weighted average method, and Garrett ranking technique. Each concept is presented with simple explanations, step-by-step procedures, examples, and interpretations to make learning easier.

Special emphasis has been given to the practical application of SPSS outputs. Researchers often find difficulty not only in performing statistical analysis but also in interpreting results correctly. This book aims to bridge that gap by explaining how statistical values can be converted into meaningful research insights.

This book is prepared with the objective of supporting undergraduate and postgraduate students, research scholars, and faculty members in management, social sciences, commerce, and related disciplines. It encourages learners to develop confidence in handling data and applying descriptive statistical tools effectively in their research work.

I hope this book will serve as a valuable learning resource and help readers move from **data collection to meaningful insights** through the effective use of SPSS.

Dr. T. Suguna

Assistant Professor of Management Studies

Virudhunagar Hindu Nadars' Senthikumara Nadar College (Autonomous)

Virudhunagar, Tamil Nadu.

Dr.A.Geethanjali

Head & Assistant Professor of Commerce

Sri Parasakthi College for women

Courtallam, Tenkasi District

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CHAPTER I

1.1 RESEARCH METHODOLOGY

1.2 Meaning of Research

Research is a systematic and structured process of collecting, examining, analyzing, and interpreting information to gain knowledge or find solutions to specific problems. It involves a detailed investigation to identify new facts, validate existing information, and develop new concepts or theories.

Definitions of Research

Some important definitions of research are:

1. C.R. Kothari:

“Research is a scientific and systematic search for relevant information on a specific topic.”

2. Clifford Woody:

“Research involves identifying and redefining problems, developing hypotheses, collecting and organizing data, analyzing information, and drawing conclusions.”

3. Redman and Mory:

“Research is a systematic effort made to acquire new knowledge.”

4. Kerlinger:

“Research is a systematic, controlled, empirical, and critical investigation of hypothetical statements about the relationships among natural phenomena.”

Objectives of Research

The objectives of research represent the major aims and purposes for conducting a research study. Research is undertaken to explore new information, confirm existing knowledge, and provide systematic solutions to various problems.

Major Objectives of Research

➤ **To Acquire New Knowledge**

Research helps in discovering new information, generating new ideas, and expanding existing knowledge in a specific area.

➤ **To Identify and Examine Problems**

A major objective of research is to identify existing problems and analyze them systematically for better understanding.

➤ **To Test Hypotheses and Theories**

Research is used to examine and verify the accuracy of existing theories and hypotheses.

➤ **To Determine Relationships**

Research helps to find and understand the relationship between different variables, factors, or concepts.

➤ **To Develop New Ideas and Methods**

Research contributes to the creation of new concepts, techniques, approaches, and methodologies.

➤ **To Find Solutions to Problems**

Research assists in developing practical solutions to various social, economic, organizational, and business-related issues.

➤ **To Support Effective Decision Making**

Research provides accurate and reliable information that helps in better planning and decision-making.

➤ **To Forecast Future Trends**

Research helps in predicting future changes, developments, and trends.

Importance of Research:

- ✓ Research plays a significant role in the fields of education, business, science, and society.
The major importance of research includes:
- ✓ **Expansion of Knowledge**
Research contributes to the discovery of new knowledge and enhances existing information.
- ✓ **Problem Identification and Solution**
Research helps in recognizing problems and finding appropriate solutions through systematic analysis.
- ✓ **Effective Decision Making**
Research provides reliable data and information for making effective decisions in business and management.
- ✓ **Improvement of Policies and Practices**
Research findings help organizations and governments develop better policies, strategies, and practices.
- ✓ **Innovation and Progress**
Research encourages creativity, new discoveries, technological development, and innovation.
- ✓ **Understanding Social Issues**
Research helps in analyzing social, economic, and organizational challenges.
- ✓ **Academic and Educational Development**
Research improves teaching methods, learning processes, and overall academic growth in educational institutions

Multiple Choice Questions (MCQs) on Research:

1. Research is a systematic process of:

- a) Guessing information
- b) Collecting and analyzing data
- c) Avoiding problems
- d) Making assumptions

Answer: b) Collecting and analyzing data

2. The main purpose of research is to:

- a) Create confusion
- b) Gain new knowledge
- c) Reduce information
- d) Avoid decision-making

Answer: b) Gain new knowledge

3. Research helps in:

- a) Solving problems
- b) Increasing errors
- c) Ignoring facts
- d) Reducing knowledge

Answer: a) Solving problems

4. Who defined research as “a scientific and systematic search for pertinent information”?

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

Answer: b) C.R. Kothari

5. Research involves the process of:

- a) Data collection and analysis
- b) Random thinking
- c) Personal opinion only
- d) Avoiding investigation

Answer: a) Data collection and analysis

6. A hypothesis is:

- a) A final conclusion
- b) A temporary assumption to be tested
- c) A research report
- d) A data table

Answer: b) A temporary assumption to be tested

7. Research is conducted to:

- a) Verify existing knowledge
- b) Ignore existing theories
- c) Avoid facts
- d) Stop learning

Answer: a) Verify existing knowledge

8. Which of the following is an objective of research?

- a) To identify problems
- b) To hide information
- c) To increase confusion
- d) To avoid analysis

Answer: a) To identify problems

9. Research helps in decision-making by providing:

- a) Uncertain information
- b) Reliable information
- c) False information
- d) Unrelated information

Answer: b) Reliable information

10. Research that aims to develop new theories is called:

- a) Basic research
- b) Casual research
- c) Random research
- d) Personal research

Answer: a) Basic research

11. Which one is a source of research data?

- a) Observation
- b) Guessing
- c) Rumours
- d) Assumptions

Answer: a) Observation

12. Research methodology refers to:

- a) Methods used to conduct research
- b) Final results only
- c) Research title
- d) Data entry only

Answer: a) Methods used to conduct research

13. The first step in research is:

- a) Data analysis
- b) Identifying the research problem
- c) Writing conclusion
- d) Preparing tables

Answer: b) Identifying the research problem

14. Research findings are useful for:

- a) Planning and development
- b) Creating errors
- c) Ignoring problems
- d) Avoiding decisions

Answer: a) Planning and development

15. A good research study should be:

- a) Systematic and objective
- b) Random and biased
- c) Unplanned
- d) Based on assumptions only

Answer: a) Systematic and objective

16. Research helps organizations to:

- a) Improve policies and strategies
- b) Avoid growth
- c) Reduce knowledge
- d) Ignore changes

Answer: a) Improve policies and strategies

17. The process of collecting information for research is called:

- a) Data collection
- b) Data rejection
- c) Data hiding
- d) Data removal

Answer: a) Data collection

18. Research contributes to:

- a) Innovation and development
- b) Lack of progress
- c) Knowledge reduction
- d) Decision avoidance

Answer: a) Innovation and development

19. The result obtained after research analysis is called:

- a) Conclusion
- b) Assumption
- c) Question
- d) Hypothesis

Answer: a) Conclusion

20. Research is important in education because it helps in:

- a) Academic development
- b) Reducing learning
- c) Avoiding knowledge
- d) Stopping improvement

Answer: a) Academic development

1.2 HYPOTHESIS FORMULATION :

Meaning of Hypothesis

A hypothesis is a tentative statement or assumption that provides a possible explanation for a research problem. It is formulated based on existing knowledge and can be tested through scientific methods. A hypothesis helps researchers to examine relationships between variables and draw meaningful conclusions.

Types of Hypothesis

1. Null Hypothesis (H_0)

The null hypothesis states that there is no significant difference or relationship between the variables under study. It assumes that any observed difference is due to chance.

2. Alternative Hypothesis (H_1)

The alternative hypothesis states that there is a significant difference or relationship between the variables. It represents the researcher's expectation or prediction.

The alternative hypothesis can be classified into:

Directional Hypothesis

A directional hypothesis predicts the specific direction of the relationship or difference between variables.

Non-Directional Hypothesis

A non-directional hypothesis indicates that a relationship or difference exists but does not specify the direction.

Importance of Hypothesis in Research

- Helps in defining the focus of the research study.
- Guides the process of data collection and analysis.
- Provides a basis for testing theories and assumptions.
- Helps researchers to make logical conclusions.

1.3 LEVEL OF SIGNIFICANCE

Meaning of Significance Level

The significance level is a statistical measure used in hypothesis testing to determine whether the research findings are statistically significant. It represents the maximum probability of rejecting a true null hypothesis (Type I error).

The significance level is usually represented by **α (alpha)**. For example, a significance level of **0.05** indicates that the researcher accepts a 5% risk of making an incorrect decision by rejecting the null hypothesis.

Decision Rule Based on Significance Level

- If the **p-value $\leq$ significance level**, the null hypothesis is rejected, indicating a significant result.
- If the **p-value $>$ significance level**, the null hypothesis is not rejected, indicating that the result is not statistically significant.

Example:

If the significance level is 0.05 and the obtained p-value is 0.03, the null hypothesis is rejected because 0.03 is less than 0.05.

Common Levels of Significance

1. 0.05 (5%)

- It is the most commonly used significance level in research studies.
- It indicates a 5% chance of committing a Type I error.
- Widely applied in management, social science, and behavioral research.

2. 0.01 (1%)

- It represents a stricter significance level with only a 1% risk of Type I error.
- Used in research areas where accuracy and reliability are highly important.

3. 0.10 (10%)

- It allows a higher risk of Type I error.
- Commonly used in exploratory studies where researchers investigate new areas.

4. 0.001 (0.1%)

- It is a highly strict significance level.
- Used in studies requiring very high accuracy and precision.

Factors Influencing the Selection of Significance Level

Risk of Type I Error

A lower significance level reduces the possibility of rejecting a true null hypothesis.

Nature of Research Field

Different fields follow different standards; for example, 0.05 is common in management research, while stricter levels may be used in medical studies.

Impact of Research Decisions

When wrong decisions can create serious consequences, researchers prefer lower significance levels such as 0.01 or 0.001.

Related Statistical Terms

1. p-value

The p-value indicates the probability of obtaining the observed results when the null hypothesis is true. It helps researchers decide whether to accept or reject the null hypothesis.

2. Type I Error (False Positive)

Type I error occurs when the researcher rejects the null hypothesis even though it is actually true.

3. Type II Error (False Negative)

Type II error occurs when the researcher fails to reject the null hypothesis even though it is false.

Multiple Choice Questions on Hypothesis (Research Methodology)

1. A hypothesis is a:

- a) Final conclusion of research
- b) Tentative statement that can be tested
- c) Research report
- d) Data collection method

Answer: b) Tentative statement that can be tested

2. The main purpose of a hypothesis is to:

- a) Increase research cost
- b) Guide the research study
- c) Avoid data analysis
- d) Prepare tables

Answer: b) Guide the research study

3. A hypothesis is formulated based on:

- a) Random guessing
- b) Existing knowledge and theories
- c) Personal opinion only
- d) Unrelated information

Answer: b) Existing knowledge and theories

4. The hypothesis that states there is no relationship between variables is called:

- a) Alternative hypothesis
- b) Directional hypothesis
- c) Null hypothesis
- d) Research hypothesis

Answer: c) Null hypothesis

5. Null hypothesis is represented as:

- a) H_1
- b) H_0
- c) H_2
- d) H_r

Answer: b) H_0

6. The alternative hypothesis indicates:

- a) No difference exists
- b) A significant difference or relationship exists
- c) Data is not required
- d) Research is unnecessary

Answer: b) A significant difference or relationship exists

7. A hypothesis that predicts the direction of relationship is called:

- a) Null hypothesis
- b) Directional hypothesis
- c) Non-directional hypothesis
- d) Statistical error

Answer: b) Directional hypothesis

8. A hypothesis that does not specify the direction of relationship is called:

- a) Directional hypothesis
- b) Null hypothesis
- c) Non-directional hypothesis
- d) Alternative variable

Answer: c) Non-directional hypothesis

9. Hypothesis testing helps researchers to:

- a) Verify assumptions
- b) Avoid conclusions
- c) Ignore data
- d) Stop research

Answer: a) Verify assumptions

10. A good hypothesis should be:

- a) Untestable
- b) Clear and testable
- c) Very lengthy
- d) Based on imagination only

Answer: b) Clear and testable

11. Significance level is represented by:

- a) β (Beta)
- b) α (Alpha)
- c) μ (Mean)
- d) σ (Sigma)

Answer: b) α (Alpha)

12. A significance level of 0.05 indicates:

- a) 5% risk of Type I error
- b) 50% risk of Type I error
- c) 1% risk of error
- d) No error

Answer: a) 5% risk of Type I error

13. If p-value is less than the significance level, the researcher should:

- a) Accept the null hypothesis
- b) Reject the null hypothesis
- c) Ignore the result
- d) Stop analysis

Answer: b) Reject the null hypothesis

14. Type I error occurs when:

- a) False null hypothesis is accepted
- b) True null hypothesis is rejected
- c) Data is collected incorrectly
- d) Sample size is large

Answer: b) True null hypothesis is rejected

15. Type II error occurs when:

- a) False null hypothesis is rejected
- b) True null hypothesis is accepted
- c) False null hypothesis is accepted
- d) Data is missing

Answer: c) False null hypothesis is accepted

16. The most commonly used significance level in social science research is:

- a) 0.50
- b) 0.05
- c) 0.90
- d) 0.001

Answer: b) 0.05

17. A lower significance level means:

- a) Higher chance of error
- b) Lower risk of Type I error
- c) No hypothesis testing
- d) No data analysis

Answer: b) Lower risk of Type I error

18. The p-value is used to:

- a) Measure sample size
- b) Decide statistical significance
- c) Collect data
- d) Create hypotheses

Answer: b) Decide statistical significance

19. Hypothesis testing is a part of:

- a) Data entry
- b) Inferential statistics
- c) Sampling only
- d) Report writing

Answer: b) Inferential statistics

20. The process of examining whether a hypothesis is supported by data is called:

- a) Hypothesis testing
- b) Data coding
- c) Sampling design
- d) Literature review

Answer: a) Hypothesis testing

1.4 MEASUREMENT SCALES IN SPSS :

A **Scale** in **IBM SPSS Statistics** refers to the measurement level used for analyzing continuous numerical variables. It is applied to data that contains meaningful numerical values with equal differences between measurements. Scale variables allow researchers to perform various statistical analyses such as calculating the **mean, standard deviation, correlation, and other statistical tests**.

Examples of Scale Data

- Age (20, 25, 30 years)
- Income
- Height
- Student marks

These values can be measured, compared, and analyzed using statistical techniques.

Types of Measurement Scales in Research

Measurement scales are methods used to classify, organize, and measure data in research and statistical analysis. The major types of measurement scales are:

1. Nominal Scale

A nominal scale is used to categorize data into different groups or classifications without any specific order or ranking.

Example:

Gender – Male, Female

Blood Group – A, B, AB, O

2. Ordinal Scale

An ordinal scale arranges data according to a meaningful order or ranking. The difference between categories may not be equal.

Example:

Customer Satisfaction Level – Poor, Average, Good, Excellent

3. Interval Scale

An interval scale represents values with equal intervals between measurements but does not have a true zero point. It shows the difference between values.

Example:

Temperature measured in Celsius or Fahrenheit

4. Likert Scale

A Likert scale is commonly used in research to measure attitudes, opinions, and perceptions by providing a range of response options.

Example:

Strongly Agree, Agree, Neutral, Disagree, Strongly Disagree

Importance of Scales in SPSS

- ❖ **Data Classification** – Scales help to classify variables based on their measurement levels such as nominal, ordinal, and scale.
- ❖ **Selection of Statistical Tools** – Scales help researchers choose suitable statistical methods for analysis.
- ❖ **Accurate Data Analysis** – Proper use of scales improves the accuracy and reliability of statistical results.
- ❖ **Better Data Interpretation** – Scales help in understanding patterns, relationships, and differences in data.
- ❖ **Measurement of Variables** – Scales provide a proper method for measuring and recording research variables.
- ❖ **Supports Hypothesis Testing** – Scales help in applying appropriate tests for testing research hypotheses.
- ❖ **Improves Research Quality** – Correct measurement scales increase the validity and consistency of research findings.
- ❖ **Facilitates Comparison** – Scales allow researchers to compare values and identify variations among variables.
- ❖ **Helps in Decision Making** – SPSS scale measurement provides meaningful information for effective decisions.
- ❖ **Simplifies Statistical Analysis** – Proper classification of scales makes data analysis easier and more effective.

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

1. A measurement scale used only for classification without any order is called:

- a) Ordinal Scale
- b) Interval Scale
- c) Nominal Scale
- d) Likert Scale

Answer: c) Nominal Scale

2. Which scale represents categories without ranking or order?

- a) Nominal Scale
- b) Ordinal Scale
- c) Interval Scale
- d) Ratio Scale

Answer: a) Nominal Scale

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

- a) Interval Scale
- b) Nominal Scale
- c) Ordinal Scale
- d) Likert Scale

Answer: b) Nominal Scale

4. An ordinal scale is used to measure:

- a) Categories with no order
- b) Ranking or order among categories
- c) Exact numerical differences
- d) True zero values

Answer: b) Ranking or order among categories

5. Customer satisfaction levels such as Poor, Average, and Good represent:

- a) Nominal Scale
- b) Interval Scale
- c) Ordinal Scale
- d) Ratio Scale

Answer: c) Ordinal Scale

6. Which scale shows meaningful order but the difference between values may not be equal?

- a) Nominal Scale
- b) Ordinal Scale
- c) Interval Scale
- d) Likert Scale

Answer: b) Ordinal Scale

7. Temperature measured in Celsius is an example of:

- a) Nominal Scale
- b) Ordinal Scale
- c) Interval Scale
- d) Likert Scale

Answer: c) Interval Scale

8. Interval scale has:

- a) No categories
- b) Equal intervals between values
- c) Only rankings
- d) No numerical values

Answer: b) Equal intervals between values

9. Which scale does not have a true zero point?

- a) Nominal Scale
- b) Ordinal Scale
- c) Interval Scale
- d) Ratio Scale

Answer: c) Interval Scale

10. Likert scale is mainly used to measure:

- a) Height and weight
- b) Attitudes and opinions
- c) Age and income
- d) Temperature

Answer: b) Attitudes and opinions

11. “Strongly Agree to Strongly Disagree” is an example of:

- a) Nominal Scale
- b) Ordinal Scale
- c) Likert Scale
- d) Interval Scale

Answer: c) Likert Scale

12. Which scale is commonly used in questionnaire-based research?

- a) Likert Scale
- b) Nominal Scale
- c) Interval Scale
- d) Ratio Scale

Answer: a) Likert Scale

13. Blood group classification is an example of:

- a) Ordinal Scale
- b) Nominal Scale
- c) Interval Scale
- d) Likert Scale

Answer: b) Nominal Scale

14. Ranking students as First, Second, and Third uses:

- a) Nominal Scale
- b) Ordinal Scale
- c) Interval Scale
- d) Likert Scale

Answer: b) Ordinal Scale

15. Which scale allows calculation of differences between values?

- a) Nominal Scale
- b) Ordinal Scale
- c) Interval Scale
- d) Likert Scale

Answer: c) Interval Scale

16. A Likert scale generally contains:

- a) Categories of agreement or disagreement
- b) Only numbers without meaning
- c) Physical measurements
- d) Random classifications

Answer: a) Categories of agreement or disagreement

17. In SPSS, measurement levels help researchers to:

- a) Delete data
- b) Select suitable statistical analysis
- c) Avoid research
- d) Reduce variables

Answer: b) Select suitable statistical analysis

18. Which measurement scale provides the highest level of information among the given options?

- a) Nominal Scale
- b) Ordinal Scale
- c) Interval Scale
- d) Likert Scale

Answer: c) Interval Scale

19. A satisfaction survey using five response options is measured using:

- a) Likert Scale
- b) Nominal Scale
- c) Interval Scale
- d) Ratio Scale

Answer: a) Likert Scale

20. Measurement scales are important in research because they:

- a) Help in proper data analysis and interpretation
- b) Create errors in data
- c) Remove research objectives
- d) Avoid statistical methods

Answer: a) Help in proper data analysis and interpretation

CHAPTER II

2.1 OVERVIEW OF THE SPSS ENVIRONMENT :

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 social science is often favored by beginners due to the use of 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 visualization are high-quality diagrams and graphs such as histograms, box plots, bar charts, scatter plots, and more. Customization options allow users to modify visual elements like colors, 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 social science has been a longstanding choice in specializations like psychology, sociology, and education for conducting surveys and experimental research is also called **Social Science Research**.

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

3. Statistical packages for social science that help healthcare researchers analyze clinical trials, epidemiological studies, and health surveys are also called **Health Research**.

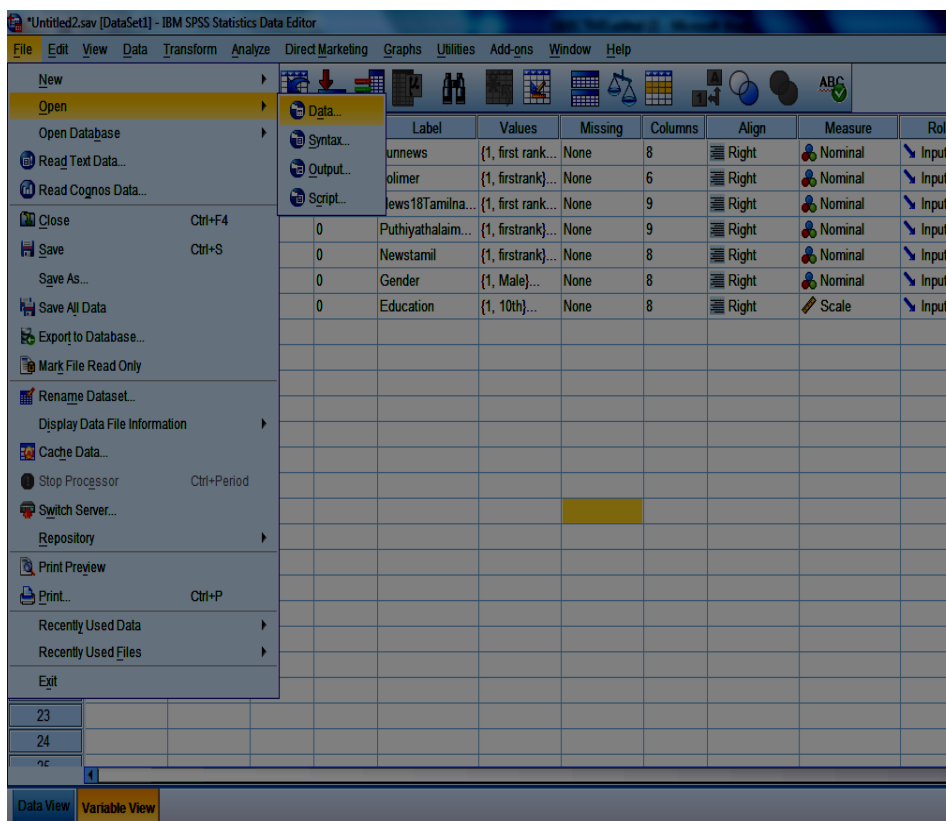
4. Statistical packages for social science are widely used for analyzing large public datasets, census data, and social trends also called **Government and Policy Analysis**.

2.2 Creating a New Data Set

Open a document:

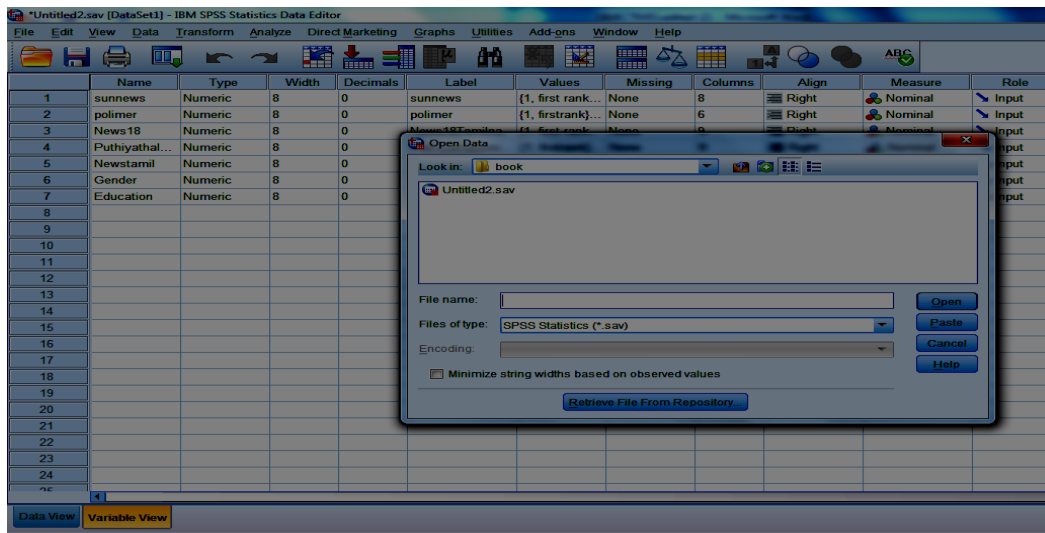
Step 1: Go to **File > Open** and select **Data, Syntax, or Output**. To browse files on your hard drive, click **Open**.

Fig 1: Open a document



Step 2: Browse the files on your hard drive and click **Open**.

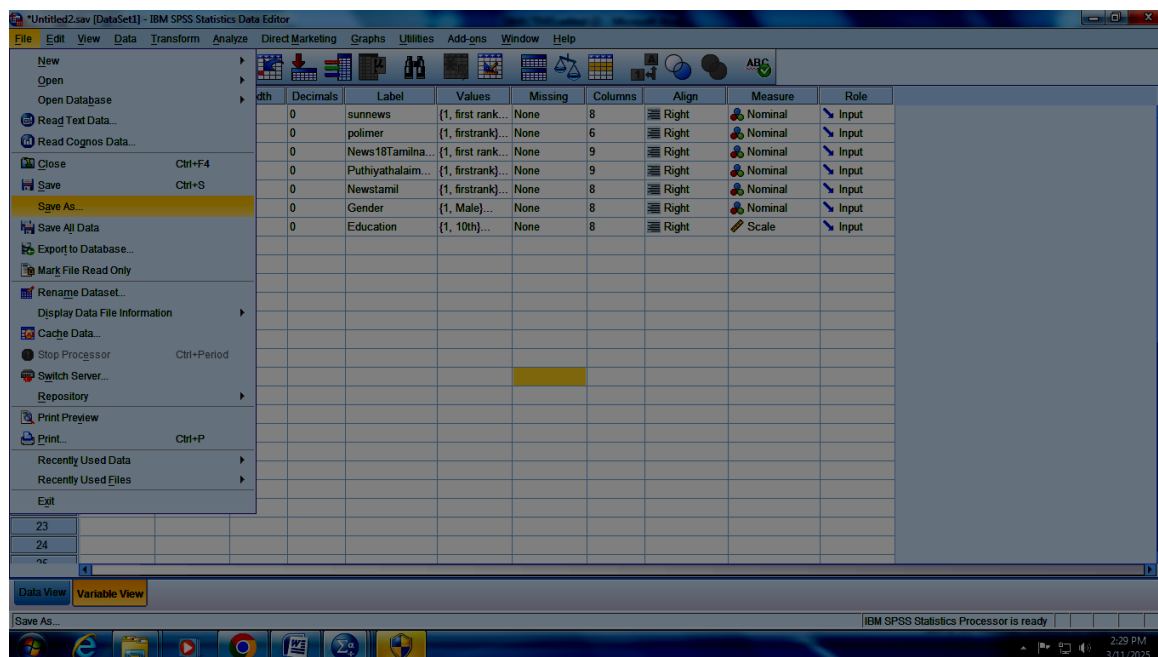
Fig 2: Browse the files



Save a document:

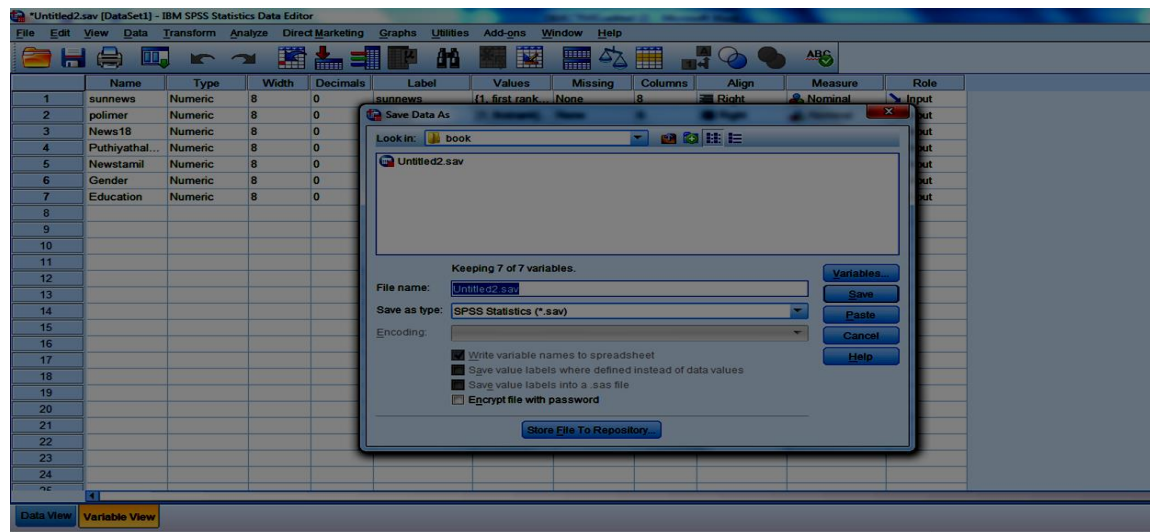
Step 1: Go to File > Save As.

Fig 3: Save a document



Step 2: Type a descriptive name, then click **Save**.

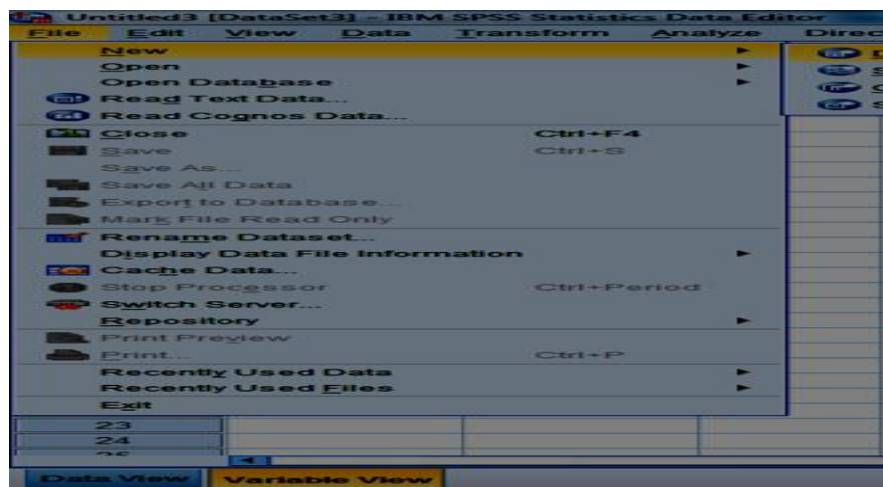
Fig 4: Save



New Data Set

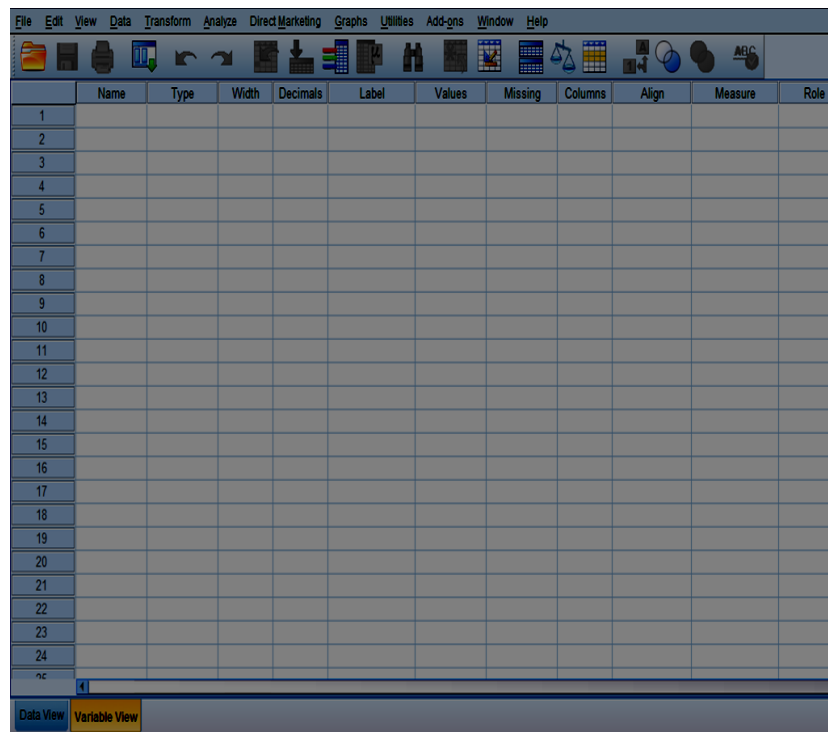
Step 1: Go to **File > New > Data**, and a data sheet will open.

Fig 5: New Data Set



Step 2: Datasheet → open

Fig 6: Datasheet



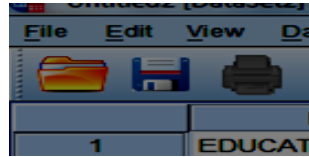
2. 3 UNDERSTANDING VARIABLE VIEW :

In Variable View, different columns are displayed. Each row represents a variable. A variable is a measurable characteristic that can vary, such as height, weight, number of children, academic level, gender, and so on.

Functions

Name: The name of the variable. You can choose it, but it should be clear and meaningful. It should not start with a number or symbol, as SPSS will not accept it, and spaces are not allowed in variable names. For example: “Income level” should be written without a space, such as “Income_level”

Fig 7:Functions



Type: Indicates the type of variable, usually Numeric (numbers only, e.g., age, number of children) or String (text or letters for qualitative data). In questionnaires, responses are often coded into numbers, such as “Man” = 0 and “Woman” = 1.

Width and Decimals: Width defines how many characters can be entered in a cell (default is 8), while Decimals controls the number of decimal places shown for numeric values (default is 2, displayed as .00).

Label: Provides a clear description of the variable, usually based on the questionnaire question or a precise explanation of what the variable represents, such as “What is your highest level of education?”.

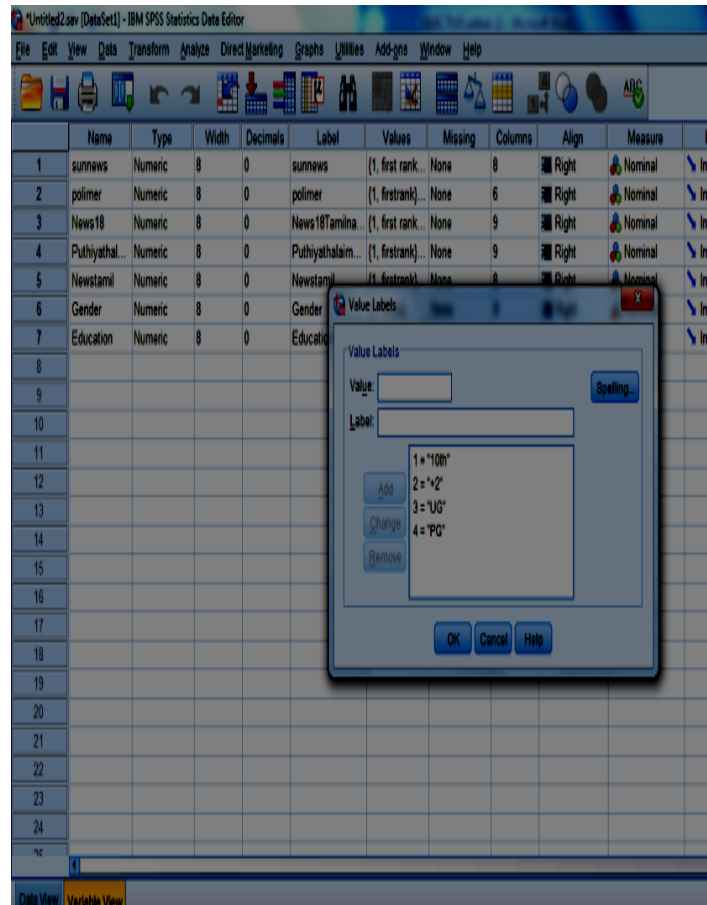
Fig 8:Labels



Values: Used to assign labels to numeric codes for response options. For example, Education level can be coded as 1 = 10th, 2 = +2, 3 = UG, and 4 = PG, helping SPSS interpret each number correctly.

How to enter values: In Value Labels, type the number (e.g., 1) and its corresponding label (e.g., “10th”), then click **Add** and repeat for all categories such as 2 = “+2”, 3 = “UG”, and 4 = “PG”.

Fig 9: Enter the values in the data sheet



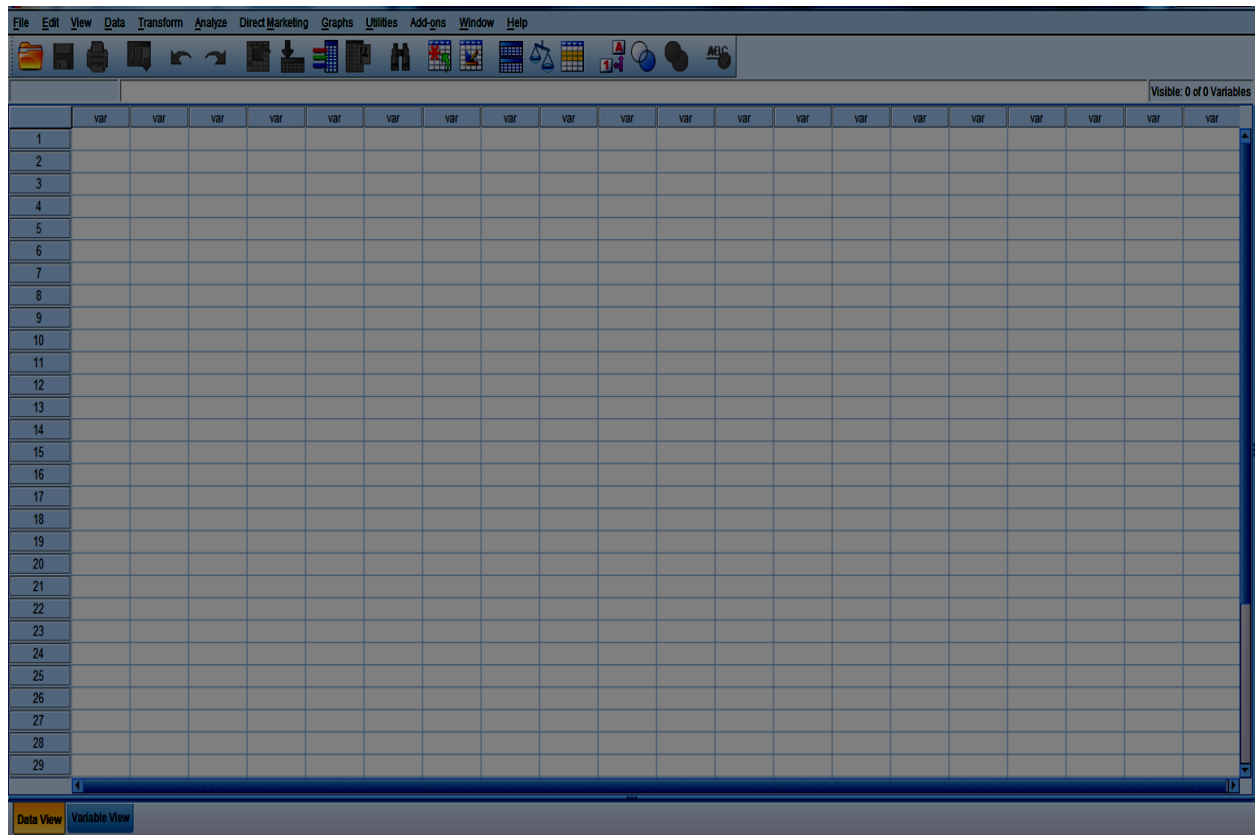
Missing:Missing: The missing values default the coded will be dot symbol ".". for numerical variables or string variables, cells will be left blank in the data set.

2.4 Understanding Data View

Step 1: After defining the data structure, switch to **Data View** by clicking the “Data View” tab in the lower-left corner.

Step 2: In Data View, you can now enter and review your actual data in the dataset.

Fig 10: Data view

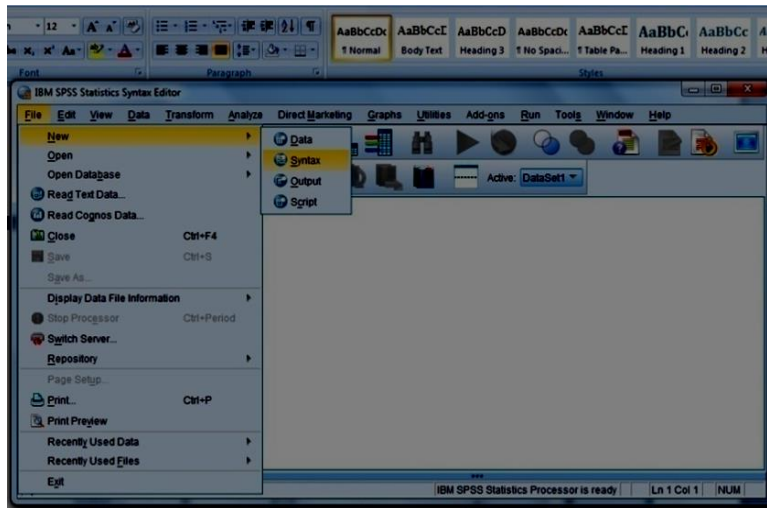


2.5 Viewing and Interpreting Output

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.

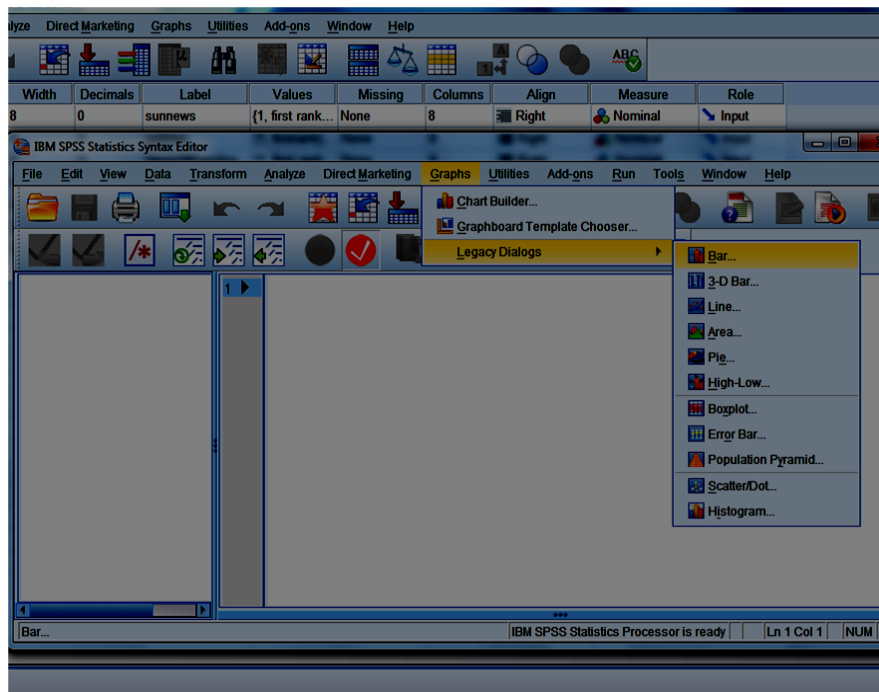
Step1:Go to File> Select New> Click Syntax

Fig 11: Syntax



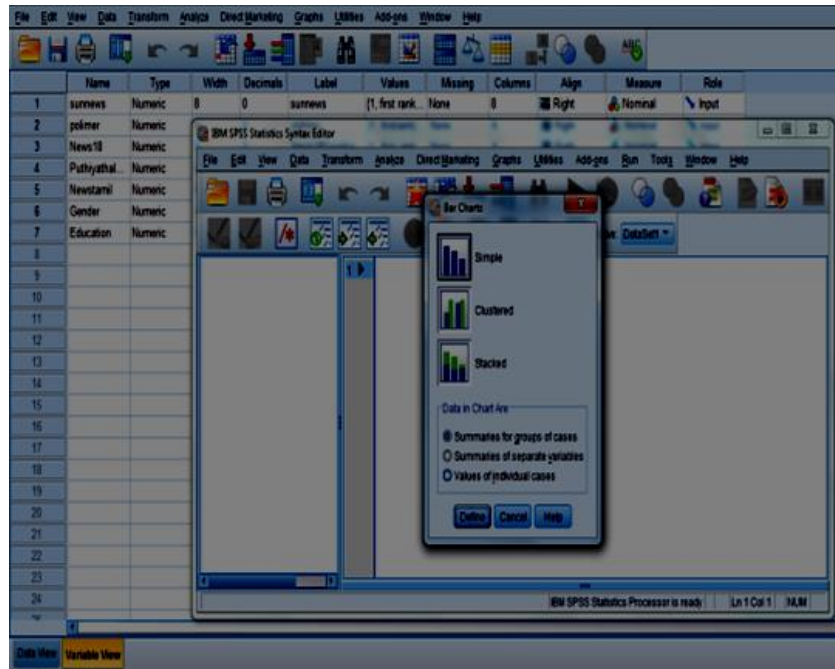
Step2: Choose Graphs> Select Legacy Dialogs> Click Bar chart

Fig 12:Bar chart



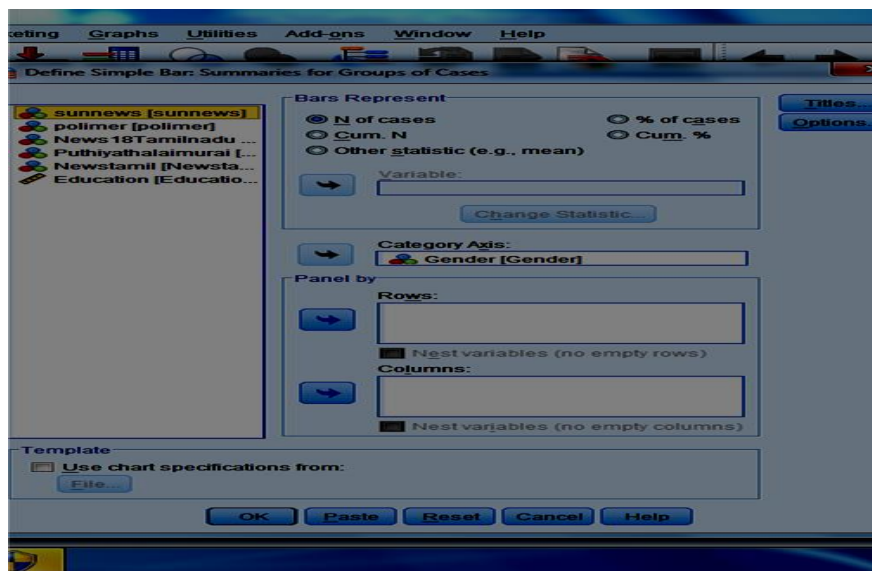
Step3: Choose Bar charts >Click Simple option

Fig 13: Bar charts



Step4: Choose Simple >Simple Bar window display>choose category Axis Gender

Fig 14: Simple Bar window display



Multiple Choice Questions (MCQs) on SPSS

1. SPSS stands for:

- a) Statistical Package for Social Science
- b) Statistical Package for the Social Sciences
- c) Statistical Program for Scientific Studies
- d) Social Science Processing System

Answer: b) Statistical Package for the Social Sciences

2. SPSS was originally developed by:

- a) Microsoft
- b) Google
- c) IBM
- d) Oracle

Answer: c) IBM

3. SPSS is mainly used for:

- a) Graphic designing
- b) Data analysis and statistical computation
- c) Web development
- d) Programming games

Answer: b) Data analysis and statistical computation

4. In SPSS, rows represent:

- a) Variables
- b) Cases or observations
- c) Formulas
- d) Results

Answer: b) Cases or observations

5. In SPSS, columns represent:

- a) Variables
- b) Cases
- c) Reports
- d) Charts

Answer: a) Variables

6. The window used to define variables in SPSS is called:

- a) Data View
- b) Output View
- c) Variable View
- d) Syntax View

Answer: c) Variable View

7. The window where data values are entered in SPSS is:

- a) Data View
- b) Variable View
- c) Output Viewer
- d) Syntax Editor

Answer: a) Data View

8. Which type of analysis compares two group means?

- a) Correlation
- b) Independent Sample t-test
- c) Frequency Analysis
- d) Regression

Answer: b) Independent Sample t-test

9. Which statistical test compares the mean of a sample with a known value?

- a) One Sample t-test
- b) Chi-square test
- c) ANOVA
- d) Correlation

Answer: a) One Sample t-test

10. SPSS is widely used in:

- a) Social sciences and research
- b) Cooking
- c) Mechanical design
- d) Animation

Answer: a) Social sciences and research

11. The output generated by SPSS is displayed in:

- a) Data Editor
- b) Output Viewer
- c) Variable Editor
- d) Syntax Window

Answer: b) Output Viewer

12. Which menu is used to enter and manage data in SPSS?

- a) Data Menu
- b) File Menu
- c) Edit Menu
- d) Help Menu

Answer: a) Data Menu

13. A numerical variable in SPSS is called:

- a) String variable
- b) Numeric variable
- c) Label variable
- d) Text variable

Answer: b) Numeric variable

14. Which analysis measures the relationship between two variables?

- a) Correlation
- b) Frequency
- c) Mean
- d) Median

Answer: a) Correlation

15. ANOVA in SPSS is used to:

- a) Compare more than two group means
- b) Create documents
- c) Enter data
- d) Draw pictures

Answer: a) Compare more than two group means

16. The file extension of an SPSS data file is:

- a) .doc
- b) .xls
- c) .sav
- d) .ppt

Answer: c) .sav

17. The SPSS Syntax Editor is used for:

- a) Writing and executing commands
- b) Entering student marks
- c) Creating images
- d) Printing reports

Answer: a) Writing and executing command

18. Frequency analysis in SPSS is used to:

- a) Summarize data distribution
- b) Delete software
- c) Create programs
- d) Design websites

Answer: a) Summarize data distribution

19. Which measurement level includes categories without order?

- a) Scale
- b) Ordinal
- c) Nominal
- d) Ratio

Answer: c) Nominal

20. SPSS helps researchers to:

- a) Analyze and interpret data
- b) Manufacture products
- c) Create hardware
- d) Browse the internet

Answer: a) Analyze and interpret data

CHAPTER III

3.1 INTRODUCTION TO DESCRIPTIVE ANALYSIS

Descriptive analysis is a statistical method used to summarize and explain the important features of a dataset. It helps researchers to organize, present, and understand the collected data in a simple way.

In research and business studies, descriptive analysis is used to present data through tables, charts, graphs, percentages, averages, and frequency distributions. It helps to understand what the data shows. It explains the information in the data but does not explain the reasons behind it.

Benefits of Descriptive Analysis

1. **Simplifies Complex Data** – It reduces large amounts of data into simple summaries that are easy to understand.
2. **Improves Understanding of Data** – It helps researchers to easily study and interpret the collected information.
3. **Helps in Decision Making** – It provides useful information for making proper business and research decisions.
4. **Finds Patterns and Trends** – It helps to identify common patterns, changes, and trends in the data.
5. **Easy Data Presentation** – It allows data to be presented clearly using tables, charts, and graphs.
6. **Base for Further Analysis** – It is the first step before applying advanced statistical methods.

3.1.1 HOW TO USE DESCRIPTIVE ANALYSIS IN RESEARCH

Descriptive analysis is used in research to **summarize, organize, and explain collected data** in a simple and meaningful way. It helps researchers understand the characteristics of respondents and the important features of the data.

Steps to Use Descriptive Analysis in Research

1. Collect Data

- First, collect data from respondents through questionnaires, surveys, interviews, or observations.
- Example: Collecting responses from 200 customers about satisfaction level.

2. Organize the Data

- Arrange the collected data in a proper format using tables or statistical software like SPSS.
- Variables such as age, gender, income, satisfaction score, etc., are entered for analysis.

3. Apply Descriptive Statistical Tools

Researchers use different tools to summarize data:

- **Frequency Analysis** – Used to find the number of respondents in each category.
Example: Number of male and female respondents.
- **Percentage Analysis** – Used to show data in percentage form.
Example: 60% of customers are satisfied with the service.
- **Mean Analysis** – Used to find the average value.
Example: Average satisfaction score of customers.
- **Standard Deviation** – Used to measure the variation or difference in responses.
- **Ranking Analysis** – Used to identify the importance of factors based on respondents' opinions.

4. Present the Results

- The results are presented using:
 - Tables
 - Bar charts
 - Pie charts
 - Graphs

5. Interpret the Findings

- Explain what the results indicate.
- Example: "The majority of respondents are satisfied with online banking services."

Example in Research

Research Topic: Customer Satisfaction towards Online Shopping

Data Collected: Responses from 100 customers

Descriptive Analysis:

- Frequency: 70 male and 30 female respondents
- Percentage: 70% customers prefer online shopping
- Mean Score: Average satisfaction level is 4.2 out of 5
- Standard Deviation: Shows variation in customer opinions

Conclusion:

Descriptive analysis helps the researcher understand the general characteristics and opinions of respondents before conducting advanced statistical analysis.

3.2 TOOLS USED IN DESCRIPTIVE ANALYSIS

1. **Frequency Distribution** – It shows the number of times each value occurs in the data.
2. **Percentage Analysis** – It represents data in the form of percentages for easy comparison.
3. **Weighted Average Method** – It calculates an average by giving different importance or weights to values.
4. **Mean Score Analysis** – It finds the average score of responses, especially in survey-based research.
5. **Garrett Ranking Method** – It converts ranks given by respondents into scores to identify the most important factors.
6. **Standard Deviation** – It shows how much the values differ from the average value.

Key Points to Remember

- Descriptive analysis summarizes and organizes collected data.
- It is the first step in statistical data analysis.
- It explains what happened in the data, not the reason behind it.
- It uses measures like mean, median, and mode to describe data.
- It helps in presenting and interpreting data clearly.
- It is widely used in research, business, economics, and social science studies.

3.2.1 PURPOSE OF DESCRIPTIVE ANALYSIS

The main purpose of descriptive analysis is to organize, summarize, and present data in a simple and meaningful way.

The important purposes are:

1. To summarize large amounts of data in an easy format.
2. To describe the main features of data using measures like mean, median, and standard deviation.
3. To identify patterns and trends in the dataset.
4. To present information through tables, charts, and graphs.
5. To support effective decision-making in research and business.

Multiple Choice Questions (MCQs) on Descriptive Statistics

1. Descriptive statistics is mainly used to:

- a) Predict future events
- b) Summarize and describe data
- c) Test hypotheses only
- d) Create experiments

Answer: b) Summarize and describe data

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

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

Answer: c) Mean

3. The average value of a dataset is called:

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

Answer: c) Mean

4. The middle value in an arranged dataset is called:

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

Answer: b) Median

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

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

Answer: c) Mode

6. Frequency distribution shows:

- a) Relationship between variables
- b) Number of times a value occurs
- c) Future predictions
- d) Cause and effect

Answer: b) Number of times a value occurs

7. Percentage analysis represents data in the form of:

- a) Ratios only
- b) Percentages
- c) Equations
- d) Formulas

Answer: b) Percentages

8. Standard deviation measures:

- a) Average value
- b) Data variation or spread
- c) Number of observations
- d) Ranking order

Answer: b) Data variation or spread

9. Which tool is used to present data visually?

- a) Charts and graphs
- b) Equations
- c) Hypothesis testing
- d) Sampling

Answer: a) Charts and graphs

10. Descriptive analysis explains:

- a) Why something happens
- b) What the data shows
- c) Future outcomes
- d) Research problems

Answer: b) What the data shows

11. Which of the following is NOT a descriptive statistics tool?

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

Answer: c) Regression

12. The difference between the highest and lowest values is called:

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

Answer: b) Range

13. Descriptive analysis is the _____ step in data analysis.

- a) Final
- b) First
- c) Second
- d) Last

Answer: b) First

14. A table that shows the distribution of data is called:

- a) Frequency table
- b) Research table
- c) Variable table
- d) Summary table

Answer: a) Frequency table

15. Weighted average is calculated by:

- a) Ignoring values
- b) Giving importance to different values
- c) Removing data
- d) Ranking data only

Answer: b) Giving importance to different values

16. Descriptive statistics are widely used in:

- a) Research and business studies
- b) Sports only
- c) Engineering only
- d) Entertainment only

Answer: a) Research and business studies

17. Garrett Ranking method is used to:

- a) Calculate average
- b) Identify rank order of factors
- c) Find standard deviation
- d) Create graphs

Answer: b) Identify rank order of factors

18. Which measure shows how much data values differ from the mean?

- a) Standard deviation
- b) Mode
- c) Frequency
- d) Percentage

Answer: a) Standard deviation

19. SPSS can be used for descriptive analysis to:

- a) Analyze and summarize data
- b) Design websites
- c) Create videos
- d) Edit documents

Answer: a) Analyze and summarize data

20. The main purpose of descriptive statistics is to:

- a) Organize and present data clearly
- b) Prove theories only
- c) Predict exact future results
- d) Control experiments

Answer: a) Organize and present data clearly

CHAPTER IV

4.1 FREQUENCY DISTRIBUTION

Meaning:

Frequency distribution is a statistical technique used to arrange data into different groups or categories and show the number of times each value appears in the dataset.

Importance of Frequency Distribution

1. **Organizes Data** – It arranges large amounts of data in a clear and systematic way.
2. **Easy Understanding** – It helps researchers to easily understand, summarize, and interpret the collected data.
3. **Shows Data Pattern** – It helps to identify how often each value or category occurs.
4. **Supports Statistical Analysis** – It is useful for further analysis using measures such as mean, median, and mode.
5. **Improves Data Presentation** – It helps to present data clearly through tables, charts, and graphs.

How to Use Frequency Distribution in Research

Frequency distribution is used in research to **organize collected data and show how many times each value or response occurs**. It helps researchers summarize data and understand the characteristics of respondents.

Steps to Use Frequency Distribution in Research

1. Collect Data

- Collect information from respondents using questionnaires, surveys, interviews, or observations.
- Example: A researcher collects data from 100 customers about their satisfaction level.

2. Identify Variables

- Select the variables that need to be analyzed.
- Examples:
 - Gender
 - Age group
 - Educational qualification
 - Income level
 - Satisfaction level

3. Arrange Data into Categories

- Group the collected data into suitable categories.
- Example:

Table: 1

Age Group of Respondents	
Age Group	Number of Respondents
18–25	30
26–35	40
36–45	20
Above 45	10

4. Calculate Frequency

- Count the number of times each category appears.
- It shows the distribution of responses among different groups.

5. Calculate Percentage (Optional)

- Convert frequencies into percentages for easy comparison.

Example: Table :2

Gender	Frequency	Percentage
Male	60	60%
Female	40	40%

6. Present Data

- Display results using:
 - Frequency tables
 - Bar charts
 - Pie charts
 - Graphs

7. Interpret the Results

- Explain the meaning of the findings.

Example Interpretation:

"The frequency distribution shows that 60% of respondents are male and 40% are female. Therefore, male respondents represent the majority of the sample."

Uses of Frequency Distribution in Research

1. To summarize large amounts of data in a simple form.
2. To understand respondent characteristics.
3. To identify common responses and trends.
4. To compare different groups of data.
5. To support further statistical analysis like mean, median, and mode..

Question1:

Construction of Pie Chart

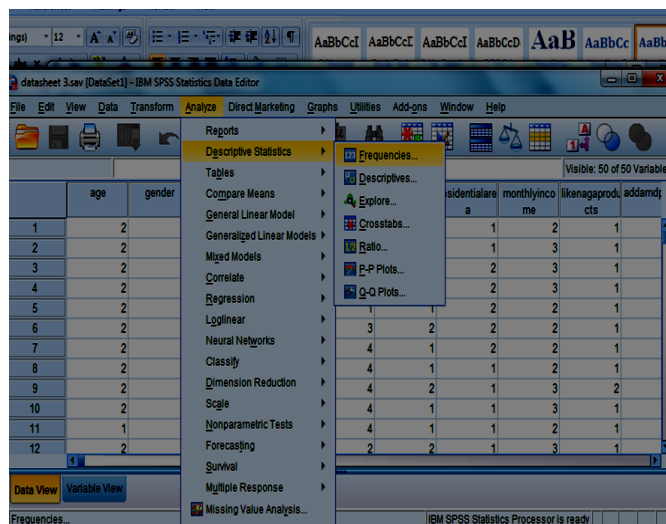
Formulate a frequency table and draw aclustered and a stacked/subdivided bar diagram for the following data on the Workers preference beverage to buy in canteen.

Workers preference	Buy
Coffee	2
Tea	3
Coffee	4
Milk	1
Coffee	3

1. Select the Analyze Menu

Click Analyze → Descriptive Statistics → Frequencies.

Fig 15: Frequencies.



2. Choose the Variable

Move the variable you want to analyze into the Variable(s) box.

Fig 16: Variables box

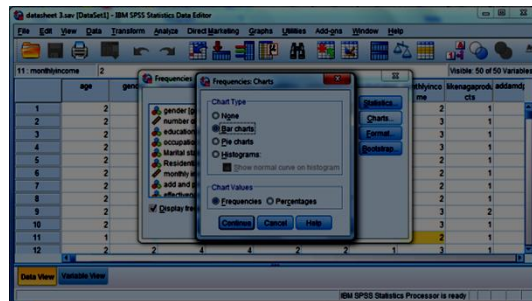
Name	Type	Width	Decimals	Label	Values	Missing	Columns	Align	Measure	
Workers	Numeric	8	0	Workers detail	None	None	8	Right	Nominal	↓
preference	Numeric	8	0	Preference item	{1, coffee}...	None	8	Right	Scale	↓
Buy	Numeric	8	0	Buy item in canteen	None	None	8	Right	Scale	↓

3.

4. Select Charts

Click Charts -> pie chart

Fig 17:Charts



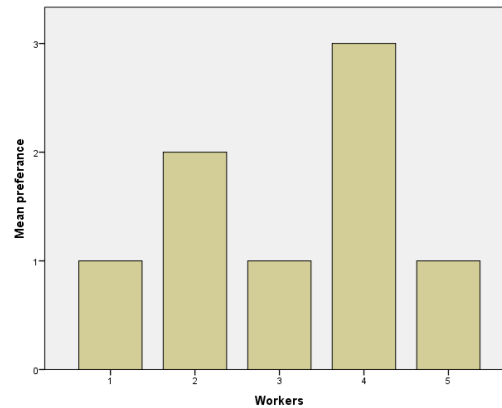
5. Run the Analysis

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

Result Output

Fig 18:output

Workers	preference	Buy	va
1	1	2	
2	2	3	
3	1	4	
4	3	1	
5	1	3	



Preference item * Buy item in canteen Crosstabulation

Table 3

Count

		Buy item in canteen				Total
		1	2	3	4	
Preference item	coffee	0	1	1	1	3
	Tea	0	0	1	0	1
	Milk	1	0	0	0	1
Total		1	1	2	1	5

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 Choice Questions (MCQs)

1. What is a frequency distribution?

- A) A graph of data
- B) A table showing the number of observations in each category or class interval
- C) A measure of central tendency
- D) A probability distribution

Answer: B

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

- A) Mean
- B) Frequency
- C) Range
- D) Class interval

Answer: B

3. The difference between the upper and lower limits of a class is called:

- A) Frequency
- B) Class mark
- C) Class width
- D) Cumulative frequency

Answer: C

4. Which type of frequency distribution is used for grouped data?

- A) Ungrouped frequency distribution
- B) Grouped frequency distribution
- C) Pie chart
- D) Scatter plot

Answer: B

5. The midpoint of a class interval is known as:

- A) Class boundary
- B) Class limit
- C) Class mark
- D) Frequency density

Answer: C

6. Which of the following is NOT a component of a frequency distribution table?

- A) Class interval
- B) Frequency
- C) Class mark
- D) Standard deviation

Answer: D

7. A cumulative frequency is obtained by:

- A) Multiplying frequencies
- B) Dividing frequencies
- C) Adding frequencies successively
- D) Subtracting frequencies

Answer: C

8. Which graph is commonly used to represent a frequency distribution?

- A) Histogram
- B) Flowchart
- C) Line graph
- D) Tree diagram

Answer: A

9. A histogram is used for:

- A) Qualitative data only
- B) Grouped continuous data
- C) Pie chart representation
- D) Bar chart comparison only

Answer: B

10. The first class interval in a frequency distribution should:

- A) Overlap with the second class
- B) Be mutually exclusive from other classes
- C) Have no frequency
- D) Always start from zero

Answer: B

11. Class intervals should generally be:

- A) Unequal
- B) Overlapping
- C) Equal in width
- D) Randomly selected

Answer: C

12. Which frequency distribution is suitable for raw data with many observations?

- A) Ungrouped distribution
- B) Grouped distribution
- C) Stem-and-leaf plot only
- D) Scatter diagram

Answer: B

13. The total of all frequencies equals:

- A) Mean
- B) Median
- C) Total number of observations
- D) Mode

Answer: C

14. Which symbol commonly represents frequency?

- A) x
- B) y
- C) f
- D) n^2

Answer: C

15. The cumulative frequency of the last class is equal to:

- A) Zero
- B) Total frequency
- C) Mean frequency
- D) Highest class limit

Answer: B

16. Which type of data is best organized using a frequency distribution?

- A) Random text
- B) Numerical data
- C) Images
- D) Audio recordings

Answer: B

17. A frequency polygon is formed by joining:

- A) Class boundaries
- B) Class marks with straight lines
- C) Frequencies only
- D) Pie chart sectors

Answer: B

18. Which measure helps determine the number of observations below a given class?

- A) Relative frequency
- B) Cumulative frequency
- C) Mode
- D) Variance

Answer: B

19. Relative frequency is calculated by:

- A) $\text{Frequency} \times \text{Total observations}$
- B) $\text{Frequency} \div \text{Total observations}$
- C) $\text{Total observations} \div \text{Frequency}$
- D) $\text{Frequency} + \text{Total observations}$

Answer: B

20. Frequency distributions are mainly used to:

- A) Increase data size
- B) Organize and summarize data
- C) Eliminate data
- D) Predict future values only

Answer: B

4.2 PERCENTAGE ANALYSIS

Percentage Analysis

Meaning

Percentage analysis is a statistical technique used to express data as percentages, making it easier to compare, interpret, and understand the results.

Importance of Percentage Analysis

1. **Simplifies Data Interpretation** – Expressing data as percentages makes information easier to understand.
2. **Facilitates Comparisons** – Enables easy comparison between different groups, categories, or variables.
3. **Enhances Data Presentation** – Presents data clearly through tables, charts, and graphs.
4. **Widely Used in Research** – Commonly applied in surveys, research studies, and business analysis to summarize findings.
5. **Supports Decision-Making** – Assists researchers, managers, and policymakers in making informed decisions based on percentage-based results.

Purpose of Percentage Analysis in SPSS

Percentage analysis in **SPSS (Statistical Package for the Social Sciences)** is used to summarize and present data in percentage form, making it easier to interpret, compare, and report research findings. The main purposes are:

1. **To Summarize Data** – Converts frequencies into percentages, providing a clear summary of the distribution of responses.
2. **To Compare Categories** – Helps compare different groups or response categories, regardless of sample size.
3. **To Simplify Interpretation** – Makes statistical results easier to understand by expressing them as percentages instead of raw counts.

4. **To Present Survey Results** – Commonly used in questionnaires and surveys to show the proportion of respondents selecting each option.
5. **To Support Decision-Making** – Provides meaningful insights that help researchers, managers, and policymakers make informed decisions.
6. **To Improve Data Presentation** – Enhances the presentation of results in tables, charts, and graphs for reports and research publications.
7. **To Identify Trends and Patterns** – Helps identify the most common responses, preferences, or characteristics within the data.
8. **To Facilitate Research Analysis** – Serves as a basic descriptive statistical tool for analyzing demographic and categorical variables in research.

Example:

If 80 out of 100 respondents are satisfied with a service, SPSS displays:

- **Frequency:** 80
- **Percentage:** 80%

This allows researchers to quickly understand that **80% of respondents are satisfied**, making the results easier to interpret and communicate.

Question1:

1. Age:

Below20	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.

Fig 19: Data File

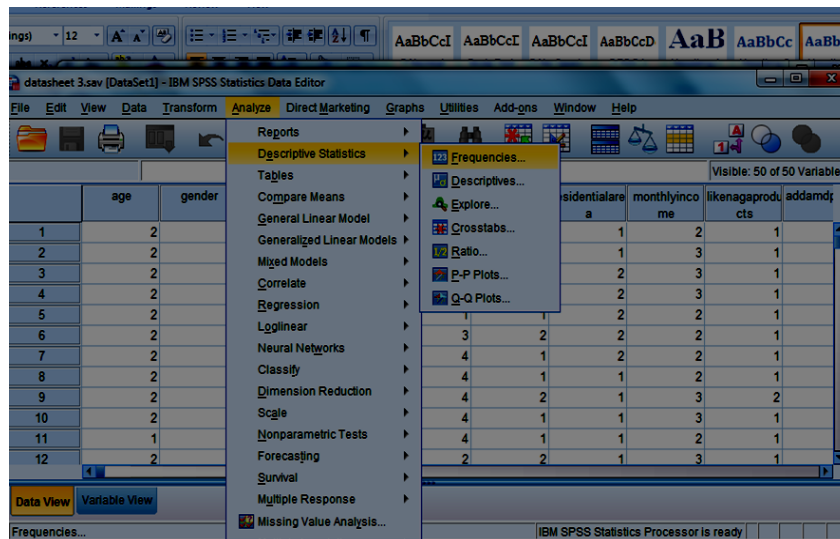
	age	gender	numberoffam	educationalle	occupation	maritalstatus	residentialare	monthlyinco	likenagapro	addamd		
1	2	2	2	2	3	1	1	2	1			
2	2	2	2	1	2	1	1	3	1			
3	2	2	2	3	2	2	2	3	1			
4	2	2	2	1	1	1	2	3	1			
5	2	2	3	2	1	1	2	2	1			
6	2	2	4	2	3	2	2	2	1			
7	2	2	2	3	4	1	2	2	1			
8	2	2	2	1	4	1	1	2	1			
9	2	2	2	2	4	2	1	3	2			
10	2	2	2	1	4	1	1	3	1			
11	1	2	2	2	4	1	1	2	1			
12	2	2	4	4	2	2	1	3	1			

2. Select the Analyze Menu

Click Analyze → Descriptive Statistics → Frequencies.

Fig 20 :Frequencies

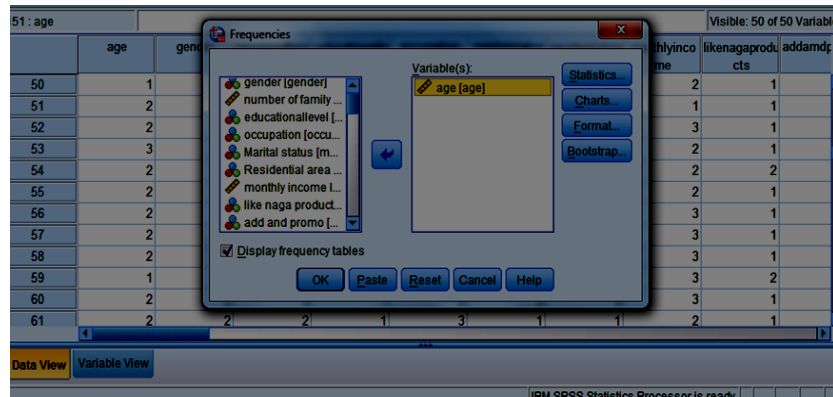
3.



4. Choose the Variable

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

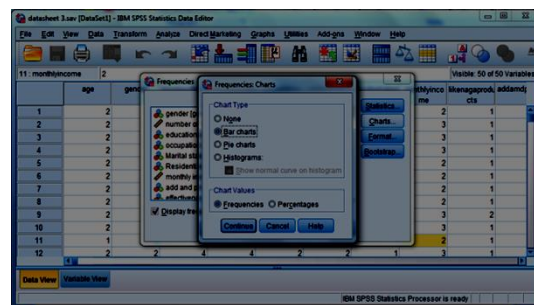
Fig 21:Variable s box(AGE)



5. Select Charts

Click Charts -> Pie Chart.

Fig 22: Pie chart



6. Run the Analysis

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

Fig 23: output

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

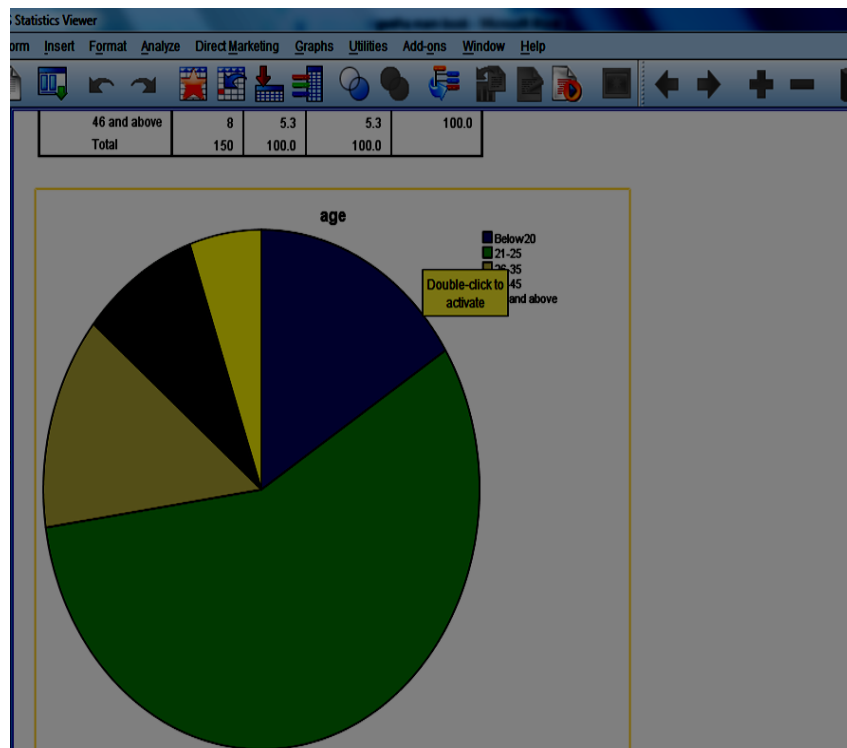
Interpretation

The table indicates that the majority of respondents, 85 (56.7%), fall within the 21–25 years age group, showing that most participants in the study are young adults. Those below 20 years constitute 24 (16%) of the sample, while the 26–35 years group accounts for 20 (13.3%). The remaining age categories are represented by comparatively smaller numbers of respondents.

Inference

It may be inferred that the sample is predominantly composed of younger individuals, especially those in the 21–25 years age bracket, whereas the participation of older age groups (36 years and above) is relatively limited.

Fig 24: output



Percentage Analysis – Multiple Choice Questions (Basic)

1. Percentage analysis is mainly used to:

- a) Predict future values
- b) Present data in a simple form
- c) Conduct hypothesis testing
- d) Calculate correlation

Answer: b

2. Percentage is expressed out of:

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

Answer: c

3. Percentage analysis helps in:

- a) Data collection
- b) Data interpretation
- c) Sampling
- d) Coding

Answer: b

4. If 50 out of 100 respondents agree, the percentage is:

- a) 25%
- b) 50%
- c) 75%
- d) 100%

Answer: b

5. The formula for percentage is:

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

Answer: a

6. Percentage analysis is a part of:

- a) Inferential statistics
- b) Descriptive statistics
- c) Predictive analysis
- d) Regression analysis

Answer: b

7. Which of the following is expressed in percentage?

- a) Mean
- b) Median
- c) Frequency distribution
- d) Relative frequency

Answer: d

8. Percentage helps to:

- a) Increase sample size
- b) Compare data easily
- c) Remove errors
- d) Create hypotheses

Answer: b

9. If 20 students out of 80 passed, percentage passed is:

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

Answer: b

10. Percentage is always based on:

- a) Ratio
- b) Difference
- c) Absolute value
- d) Mean only

Answer: a

11. Percentage is commonly used in:

- a) Research reports
- b) Coding software
- c) Machine learning only
- d) Experimental design only

Answer: a

12. A higher percentage indicates:

- a) Lower value
- b) Greater proportion
- c) No change
- d) Negative relation

Answer: b

13. Percentage analysis is useful for:

- a) Qualitative data only
- b) Quantitative data summary
- c) Theoretical models
- d) Sampling errors

Answer: b

14. If total respondents = 200 and 50 agree, percentage is:

- a) 10%
- b) 20%
- c) 25%
- d) 30%

Answer: c

15. Percentage helps in representing data in:

- a) Graphical form
- b) Complex form
- c) Random form
- d) Hidden form

Answer: a

16. Percentage is a type of:

- a) Measure of central tendency
- b) Relative measure
- c) Dispersion measure
- d) Correlation measure

Answer: b

17. The symbol of percentage is:

- a) #
 - b) \$
 - c) %
 - d) @
- Answer: c**

18. Percentage analysis is widely used in:

- a) SPSS and Excel
- b) Only manual calculation
- c) Only programming
- d) Only theory

Answer: a

19. If value increases, percentage generally:

- a) Decreases
- b) Remains same
- c) Increases
- d) Becomes zero

Answer: c

20. Percentage is useful because it:

- a) Complicates data
- b) Simplifies comparison
- c) Removes variables
- d) Eliminates samples

Answer: b

4.3 MEAN, MEDIAN , STANDARD DEVIATION

4.3.1 MEAN

Meaning:

Mean is the average value of a dataset. It is calculated by adding all the values and dividing the total by the number of observations.

Importance:

- It represents the central or average value of the data.
- It helps researchers understand the overall pattern or trend of the dataset.
- It is widely used in research, business analysis, economics, and social science studies.

Uses of Mean in SPSS:

- To calculate the average score, income, age, marks, or responses of respondents.
- To compare the average values between different groups.
- Used in descriptive statistics and further statistical analysis such as t-test and ANOVA.

Procedure to find Mean in SPSS:

1. Enter the data in **Data View**.
2. Click **Analyze** → **Descriptive Statistics** → **Descriptives**.
3. Select the required variable.
4. Click **OK**.
5. The mean value will appear in the output window.

4.3.2 MEDIAN

Meaning:

Median is the middle value of a dataset when the values are arranged in ascending or descending order.

Importance:

- It shows the central position of the data.
- It is useful when the dataset contains extreme values or outliers.
- It provides a better representation of data distribution in uneven datasets.

Uses of Median in SPSS:

- To identify the middle value of variables such as income, salary, age, and expenditure.
- Useful for analysing skewed data.
- Helps researchers compare central values without the effect of extreme observations.

Procedure to find Median in SPSS:

1. Enter data in **Data View**.
2. Select **Analyze** → **Descriptive Statistics** → **Frequencies**.
3. Move the variable to the analysis box.
4. Click **Statistics**.
5. Select **Median** and click **Continue** → **OK**.
6. Median value will be displayed in the output.

4.3.3 STANDARD DEVIATION

Meaning:

Standard deviation is a statistical measure that shows how much the data values are spread or deviated from the mean value.

Importance:

- It measures the variation or dispersion of data.
- A low standard deviation indicates that values are close to the mean.
- A high standard deviation indicates greater variation among values.
- It helps to understand data consistency and reliability.

Uses of Standard Deviation in SPSS:

- To measure variation in research data.
- To analyse consistency of responses in survey studies.
- Used in reliability analysis, hypothesis testing, and statistical modelling.

Procedure to find Standard Deviation in SPSS:

1. Enter data in **Data View**.
2. Click **Analyze** → **Descriptive Statistics** → **Descriptives**.
3. Select the required variable.

4. Select **Standard Deviation** option.
5. Click **OK**.
6. The standard deviation value will appear in the output.

Summary:

Mean shows the average value, Median identifies the middle value, and Standard Deviation explains the variation of data. These three measures are commonly used in SPSS for descriptive analysis and research interpretation.

4.3.4 Coefficient of Skewness and Kurtosis in SPSS

1. Coefficient of Skewness

Meaning:

Coefficient of skewness is a statistical measure that shows the **degree and direction of asymmetry** in the distribution of data. It indicates whether the data is normally distributed, positively skewed, or negatively skewed.

Types of Skewness:

- **Positive Skewness:** Data values are more concentrated on the lower side, with a long tail towards the right.
- **Negative Skewness:** Data values are more concentrated on the higher side, with a long tail towards the left.
- **Zero Skewness:** Data distribution is symmetrical.

Importance:

- Helps to understand the shape and distribution pattern of data.
- Indicates whether the data is normally distributed or not.
- Helps researchers decide the appropriate statistical tests for analysis.

Uses of Skewness in SPSS:

- To examine the normality of research data.
- To identify extreme values and unusual patterns in data.
- To check the suitability of data for statistical techniques such as correlation, regression, and t-test.
- Used in survey research and business data analysis.

Procedure to Find Skewness in SPSS:

1. Enter data in **Data View**.
2. Click **Analyze** → **Descriptive Statistics** → **Frequencies**.
3. Select the required variable.
4. Click **Statistics**.
5. Select **Skewness** and click **Continue** → **OK**.
6. The skewness value will appear in the output table.

2. Coefficient of Kurtosis

Meaning:

Coefficient of kurtosis is a statistical measure that describes the **shape and peakness (flatness) of a data distribution** compared with a normal distribution.

Types of Kurtosis:

- **Mesokurtic:** Distribution has a normal shape.
- **Leptokurtic:** Distribution is more peaked with higher concentration of values around the mean.
- **Platykurtic:** Distribution is flatter with values more spread out.

Importance:

- Helps to understand the shape of the data distribution.
- Shows whether the data has extreme values or a high concentration around the mean.
- Helps researchers evaluate the normality of data.

Uses of Kurtosis in SPSS:

- To test whether data follows a normal distribution.
- To identify the presence of extreme observations.
- Useful in financial, business, and social science research analysis.
- Helps in selecting appropriate statistical methods.

Procedure to Find Kurtosis in SPSS:

1. Enter the dataset in **SPSS Data View**.
2. Select **Analyze → Descriptive Statistics → Frequencies**.
3. Choose the required variable.
4. Click **Statistics**.
5. Select **Kurtosis** and click **Continue → OK**.
6. The kurtosis value will be displayed in the output.

Summary:

- **Skewness** explains the **symmetry and direction of data distribution**.
- **Kurtosis** explains the **peakness or spread of data distribution**.
- Both are important in SPSS for checking **data normality and selecting suitable statistical analysis methods**.

Calculation of mean, median, mode, standard deviation and efficient of skewness and kurtosis raw data

Question:

Age of the nine students is 17,13,14,18,12,15,19,12,10 given.

Calculate mean, median, mode, standard deviation and coefficient of skewness and kurtosis.

Aim:

To calculate mean, median, mode, standard deviation and efficient of skewness and kurtosis raw data.

Algorithm:

- Step 1** Open the SPSS Data Editor.
- Step 2** Click Variable View and name the variable as “AGE”. Choose Type as numeric. Let the default column width remain as such, select “3” under decimals and type “Age of the student” under value column as the data is numeric.
- Step 3** Now click the data view and type the values under the first column where the name appears.
- Step 4** Choose analyze from the main menu, click descriptive statistics, and then select frequencies. The drop down menu appears. Transfer the variable Age of the student into the variable(s): box. Check the display Age of the student under the variable(s): box.
- Step 5** Click OK to continue.
- Step 6** Click statistics to open frequencies: Statistics dialog box and select mean, median and mode under Dispersion, Skewness and Kurtosis under Distribution.
- Step 7** The statistical output appears in the screen.

Fig 25: Output

Name	Type	Width	Decimals	Label	Values	Missing	Columns	Align	Measure	Role
S.no	Numeric	8	0	Student number	None	None	8	Right	Scale	Input
Age	Numeric	8	0	Age of student	None	None	8	Right	Scale	Input

		Age of student			
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	10	1	9.1	11.1	11.1
	12	2	18.2	22.2	33.3
	13	1	9.1	11.1	44.4
	14	1	9.1	11.1	55.6
	15	1	9.1	11.1	66.7
	17	1	9.1	11.1	77.8
	18	1	9.1	11.1	88.9
	19	1	9.1	11.1	100.0
	Total	9	81.8	100.0	
Missing	System	2	18.2		
Total		11	100.0		

		Age of student	
		Valid	Missing
N		9	2
Mean		14.44	
Median		14.00	
Mode		12	
Std. Deviation		3.046	
Variance		9.278	
Skewness		.206	
Std. Error of Skewness		.717	
Kurtosis		-1.151	
Std. Error of Kurtosis		1.400	

S.no	Age	var
1	17	
2	13	
3	14	
4	18	
5	12	
6	15	
7	19	
8	12	
9	10	

Inference:

The students' average age is **14.44 years**. The ages show **moderate variation**, with **12 years being the most frequent age**. The distribution is **approximately normal with slight positive skewness**, indicating that the age data is reasonably suitable for statistical analysis

Mean, Median, Mode, and Standard Deviation – Basic MCQs (20 Questions)

1. Mean is also known as:

- Middle value
- Average value
- Most repeated value
- Highest value

Answer: b) Average value

2. The formula for calculating mean is:

- a) Highest value – Lowest value
- b) Sum of values ÷ Number of observations
- c) Middle value
- d) Most frequent value

Answer: b) Sum of values ÷ Number of observations

3. Median represents:

- a) Average value
- b) Most common value
- c) Middle value in arranged data
- d) Difference between values

Answer: c) Middle value in arranged data

4. Mode is the value that:

- a) Occurs most frequently
- b) Occurs least frequently
- c) Is always in the middle
- d) Has the highest value

Answer: a) Occurs most frequently

5. Which measure of central tendency is affected by extreme values?

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

Answer: c) Mean

6. Which measure is best for finding the middle position of data?

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

Answer: b) Median

7. If a data set has values 5, 10, 15, the mean is:

- a) 5
- b) 10
- c) 15
- d) 20

Answer: b) 10

8. In SPSS, mean is found under:

- a) Analyze → Descriptive Statistics
- b) File → Open
- c) Edit → Copy
- d) View → Toolbar

Answer: a) Analyze → Descriptive Statistics

9. Standard deviation measures:

- a) Central value
- b) Data variation or spread
- c) Most frequent value
- d) Total number of cases

Answer: b) Data variation or spread

10. A low standard deviation indicates:

- a) Data values are close to the mean
- b) Data values are highly scattered
- c) No data exists
- d) Mean is zero

Answer: a) Data values are close to the mean

11. A high standard deviation indicates:

- a) Less variation
- b) More variation in data
- c) Equal values
- d) No difference

Answer: b) More variation in data

12. Which measure can be used for both numerical and categorical data?

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

Answer: c) Mode

13. For the data 2, 4, 6, 8, 10, the median is:

- a) 4
- b) 6
- c) 8
- d) 10

Answer: b) 6

14. For the data 3, 3, 5, 7, 8, the mode is:

- a) 3
- b) 5
- c) 7
- d) 8

Answer: a) 3

15. Standard deviation is represented by:

- a) $\bar{X}$
- b) σ (Sigma)
- c) N
- d) M

Answer: b) σ (Sigma)

16. Which statistic shows the average age of students?

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

Answer: a) Mean

17. In a perfectly symmetrical distribution:

- a) Mean = Median = Mode
- b) Mean is always higher
- c) Mode is zero
- d) Median does not exist

Answer: a) Mean = Median = Mode

18. Median is preferred when data contains:

- a) Extreme values
- b) No values
- c) Equal values only
- d) Small samples only

Answer: a) Extreme values

19. In SPSS, standard deviation is available in:

- a) Descriptive Statistics
- b) Data Entry
- c) Variable Naming
- d) Chart Editing

Answer: a) Descriptive Statistics

20. Mean, Median, and Mode are called:

- a) Measures of dispersion
- b) Measures of central tendency
- c) Probability measures
- d) Regression values

Answer: b) Measures of central tendency

4.5 MEAN SCORE ANALYSIS:

MEAN SCORE ANALYSIS

Meaning:

Mean Score Analysis is a statistical technique used to find the **average score or average value** of a group of observations. It represents the central value of the data by adding all scores and dividing them by the total number of scores.

Formula:

$$\text{Mean Score} = \frac{\text{Sum of all scores}}{\text{Number of observations}}$$

Example:

If five students scored: 60, 70, 80, 90, and 100

$$\text{Mean Score} = (60+70+80+90+100) \div 5 = 80$$

The average performance of students is 80.

Importance of Mean Score Analysis

1. **Shows Average Performance**
 - Helps to understand the overall performance or response level of respondents.
2. **Summarizes Large Data**
 - Converts a large set of data into a single meaningful value.
3. **Helps in Comparison**
 - Allows researchers to compare the performance of different groups.
4. **Supports Decision Making**
 - Helps researchers and managers make decisions based on average results.
5. **Identifies Trends**
 - Shows the general pattern or tendency of data.

Uses of Mean Score Analysis in SPSS

1. Finding Average Values

- SPSS calculates the average score of variables such as satisfaction, performance, attitude, or behaviour.

2. Analyzing Survey Data

- Used to calculate the average response in Likert scale questionnaires.

Example:

- Customer satisfaction score
- Employee motivation score
- Student learning satisfaction score

3. Comparing Groups

- Researchers can compare mean scores between groups.

Example:

- Mean performance score of male and female employees.

4. Descriptive Statistics

- Mean score is used with other measures like median, standard deviation, minimum, and maximum values.

5. Research Interpretation

- Helps researchers explain the overall level of variables.

Research use :Mean score analysis helps researchers understand the overall response level and make conclusions from collected data.

The use of AI in banking have a positive and negative impact. In this study, the positive impact has been chosen and it includes faster response time, better fraud protection, reduced errors, enhanced customer service and convenience. Likert's five point scale technique has been used and presented in table

Table 5

Impact of using AI tools in banking service

Basis	Out of 60 Respondents					Total Score	Mean Score	Rank
	Strongly Agree (5)	Agree (4)	Neutral (3)	Disagree (2)	Strongly Disagree (1)			
Faster response time	27 (135)	10 (40)	9 (27)	9 (18)	5 (5)	225	3.75	V
Better fraud protection	21 (105)	19 (76)	10 (30)	7 (14)	3 (3)	228	3.8	II
Reduced errors	25 (125)	14 (56)	9 (27)	7 (14)	5 (5)	227	3.78	III
Enhanced customer service	19 (95)	21 (84)	14 (42)	5 (10)	1 (1)	232	3.87	I
Convenience	15 (75)	28 (112)	7 (21)	8 (16)	2 (2)	226	3.77	IV

Source: Primary Data**Interpretation:**

This table shows that the statement ‘Enhanced customer service’ gets first rank with the mean score of 3.87 points; ‘Better fraud protection’ gets second rank with the mean score of 3.8 points; ‘Reduced errors’ gets third rank with the mean score of 3.78 points; ‘Convenience’ gets fourth rank with the mean score of 3.77 points and ‘Faster response time’ gets fifth rank with the mean score of 3.75 points respectively.

Impact of using AI tools in banking service

The use of AI in banking has a positive and negative impact. In this study, the positive impact has been chosen and it includes faster response time, better fraud protection, reduced errors, enhanced customer service and convenience. Likert's five point scale technique has been used and presented in table .

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Mean Score Analysis – Basic Multiple Choice Questions (20 MCQs)

1. Mean score refers to:

- a) Highest value in data
- b) Lowest value in data
- c) Average value of observations
- d) Difference between values

Answer: c) Average value of observations

2. The formula for calculating mean is:

- a) Total value $\times$ Number of observations
- b) Sum of values $\div$ Number of observations
- c) Highest value – Lowest value
- d) Frequency $\times$ Score

Answer: b) Sum of values $\div$ Number of observations

3. Mean score analysis is mainly used to find:

- a) Relationship between variables
- b) Average performance or response
- c) Data errors
- d) Sample size

Answer: b) Average performance or response

4. Mean is also known as:

- a) Average
- b) Range
- c) Variance
- d) Frequency

Answer: a) Average

5. Mean score analysis is a part of:

- a) Descriptive statistics
- b) Qualitative analysis
- c) Experimental design
- d) Sampling method

Answer: a) Descriptive statistics

6. In SPSS, mean score can be calculated using:

- a) Analyze → Descriptive Statistics
- b) File → Save
- c) Edit → Copy
- d) View → Toolbar

Answer: a) Analyze → Descriptive Statistics

7. Mean score is useful for analyzing:

- a) Average responses of respondents
- b) Names of respondents
- c) Research title
- d) Questionnaire format

Answer: a) Average responses of respondents

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

- a) Low level of response
- b) Higher average level of response
- c) Missing data
- d) No relationship

Answer: b) Higher average level of response

9. Mean score analysis is commonly used in:

- a) Survey research
- b) Only laboratory experiments
- c) Computer programming
- d) Accounting only

Answer: a) Survey research

10. Which SPSS output shows the mean value?

- a) Descriptive Statistics table
- b) Data View
- c) Variable View
- d) Syntax Editor

Answer: a) Descriptive Statistics table

11. Mean score helps researchers to:

- a) Summarize large data
- b) Delete variables
- c) Create questionnaires
- d) Select samples

Answer: a) Summarize large data

12. A mean score of 4.5 on a 5-point scale indicates:

- a) Low satisfaction
- b) Moderate satisfaction
- c) High satisfaction
- d) No response

Answer: c) High satisfaction

13. Mean score analysis is suitable for:

- a) Likert scale data analysis
- b) Only photographs
- c) Text documents
- d) Personal details

Answer: a) Likert scale data analysis

14. Mean score is affected by:

- a) Extreme values
- b) Variable names
- c) Sample labels
- d) Data format

Answer: a) Extreme values

15. In SPSS, mean can be obtained through:

- a) Frequencies option
- b) Chart editor only
- c) File manager
- d) Data entry only

Answer: a) Frequencies option

16. Mean score analysis helps in:

- a) Comparing group performance
- b) Changing research objectives
- c) Creating hypotheses only
- d) Collecting data

Answer: a) Comparing group performance

17. The symbol commonly used for population mean is:

- a) X
- b) μ (Mu)
- c) r
- d) σ

Answer: b) μ (Mu)

18. Mean score analysis provides:

- a) Central value of data
- b) Individual identity
- c) Research limitations
- d) Sampling error only

Answer: a) Central value of data

19. A lower mean score indicates:

- a) Lower average response level
- b) Higher variation only
- c) More respondents
- d) Larger sample size

Answer: a) Lower average response level

20. Mean score analysis in research is mainly used for:

- a) Interpretation and decision making
- b) Data collection
- c) Questionnaire printing
- d) Literature review

Answer: a) Interpretation and decision making

4.5 GARRETT RANKING:

Meaning:

Garrett Ranking Technique is a statistical method used in research to **rank the preferences, opinions, problems, or factors** given by respondents according to their importance.

It converts the ranks given by respondents into **Garrett scores** and helps the researcher identify the **most important factor or highest priority item**.

Example:

A researcher studies the reasons for customer preference towards online shopping. Respondents rank factors like:

- Price
- Convenience
- Quality
- Delivery service

Garrett ranking helps to identify which factor is considered most important by respondents.

Importance of Garrett Ranking in Research

1. **Identifies Priority Factors**
 - Helps researchers find the most important factors among many variables.
2. **Converts Ranking into Scores**
 - Transforms different ranks into numerical scores for easy analysis.
3. **Simplifies Decision Making**
 - Helps organizations make decisions based on respondents' preferences.
4. **Useful for Opinion-Based Studies**
 - Helps analyze customer opinions, employee perceptions, and social research data.

5. Provides Clear Comparison

- Allows comparison of different factors based on their average scores.

6. Improves Research Interpretation

- Makes ranking data easier to understand and interpret.

Uses of Garrett Ranking in Research

1. Consumer Behaviour Studies

- To identify factors influencing purchase decisions.

2. Marketing Research

- To rank customer preferences and satisfaction factors.

3. Employee Studies

- To identify important factors affecting job satisfaction or motivation.

4. Education Research

- To rank problems faced by students or teachers.

5. Social Science Research

- To study priorities, challenges, and opinions of respondents.

Basic Steps in Garrett Ranking Technique

1. Collect ranks from respondents.
2. Convert ranks into Garrett scores using Garrett's table.
3. Calculate the total score for each factor.
4. Find the average Garrett score.
5. Arrange factors based on highest to lowest score.

4.5.1 Question: GARRET RANKING:

An attempt has been made to analyse the respondents' factors that influence to buy a particular brand of cooking oil by using Garret ranking method. The respondents were requested to rate five types of factor as Price, Image, content, Logo, Text .Garrets ranking technique was used in ascertaining the respondents assignment of rank for factors that influence to buy a particular most eye-catching aspect of a newspaper

STEP 1:

Ranking given by factors influence buy particular most eye-catching aspect of a newspaper and given below.

STEP 2:

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

FORMULA:

$$\text{Present position} = \frac{100 (R_{ij} - 0.5)}{N_{ij}}$$

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

N_{ij} = Number of variables ranked by the j respondent

STEP 3:

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

GARRETT'S TABLE VALUE:

Table 7

Score	Percent	Score
$\frac{1 \text{ rank} = 100(1-0.5)}{5}$	10	75
$\frac{2 \text{ rank} = 100(2-0.5)}{5}$	30	60
$\frac{3 \text{ rank} = 100(3-0.5)}{5}$	50	50
$\frac{4 \text{ rank} = 100(4-0.5)}{5}$	70	39
$\frac{5 \text{ rank} = 100(5-0.5)}{5}$	90	24

Explanation

1 10 75 The factor ranked **1st** receives the highest Garrett score (75), indicating it is the most preferred or most important factor.

2 30 60 The factor ranked **2nd** receives a Garrett score of 60, showing it is the second most preferred factor.

3 50 50 The factor ranked **3rd** is assigned a Garrett score of 50, indicating a moderate level of importance.

4 70 39 The factor ranked **4th** receives a Garrett score of 39, indicating lower preference.

5 90 24 The factor ranked **5th** receives the lowest Garrett score (24), indicating it is the least preferred factor.

AGGREGATED RANKS:**Table 8**

IMAGES			LOGOS		
Score (x)	No of respondent (f)	fx	Score (x)	No of respondent (f)	Fx
75	51	3825	75	12	900
60	40	2400	60	56	3360
50	5	250	50	26	1300
39	3	117	39	5	195
24	1	24	24	1	24
	N=100	Σfx=6,616		N=100	Σfx=5,779
Average Score=6,616/100=66.16			Average Score=5,779/100=57.79		

Table 9

TEXT			COLOR		
Score (x)	No of respondent (f)	Fx	Score (x)	No of respondent (f)	Fx
75	8	600	75	13	975
60	40	2400	60	61	3660
50	43	2150	50	16	800
39	8	312	39	9	351
24	1	24	24	1	24
	N=100	Σfx=5,486		N=100	Σfx=5,810
Average Score=5,486/100=54.86			Average Score=5,810/100=58.1		

Table 10

PRICE		
Score (x)	No of respondent (f)	Fx
75	28	2100
60	47	2820
50	14	700
39	9	351
24	2	48
	N=100	Σfx=6,019
Average Score=6,019/100=60.19		

Interpretation

The table indicates that **47 respondents** ranked **Price** in the second position, contributing the highest weighted score of **2,820**, while **28 respondents** ranked it first, contributing **2,100** points. A smaller number of respondents assigned lower ranks, with only **2 respondents** placing it in the fifth rank. The total weighted score for the factor is **6,019**, and the **average Garrett score is 60.19**. This relatively high average score suggests that **Price is considered an important factor by the respondents**. In Garrett Ranking Analysis, factors with **higher average Garrett scores are regarded as more important** and receive higher overall rankings.

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.

TABLE: 11

Result of Garrett's ranking technique

Variables	Garrett mean score	Rank
IMAGES	56.16	5
LOGOS	57.79	4
TEXT	66.16	1
COLOR	58.1	3
PRICE	60.19	2

Interpretation:

The Garrett Ranking Analysis reveals that **Text (66.16)** is the most influential packaging element affecting respondents' preferences, followed by **Price (60.19)**, **Color (58.10)**, **Logos (57.79)**, and **Images (56.16)**. This indicates that respondents give greater importance to clear and informative textual content and product price when making purchasing decisions, while images and logos have relatively less impact on their preferences.

Garrett Ranking Method – Multiple Choice Questions

1. Garrett Ranking Method is mainly used to:

- a) Measure relationship between variables
- b) Rank factors based on respondents' preferences
- c) Test hypothesis
- d) Calculate correlation

Answer: b) Rank factors based on respondents' preferences

2. Garrett Ranking Technique was developed by:

- a) Henry Garrett
- b) Karl Pearson
- c) Spearman
- d) Likert

Answer: a) Henry Garrett

3. Garrett Ranking Method is mostly used in:

- a) Experimental research
- b) Survey-based research
- c) Laboratory research
- d) Historical research

Answer: b) Survey-based research

4. The main purpose of Garrett Ranking is to identify:

- a) Average value
- b) Most important factor among alternatives
- c) Data errors
- d) Sample size

Answer: b) Most important factor among alternatives

5. In Garrett Ranking, respondents are asked to:

- a) Give scores only
- b) Rank the factors according to importance
- c) Select random options
- d) Calculate mean values

Answer: b) Rank the factors according to importance

6. The first step in Garrett Ranking Method is:

- a) Calculate mean score
- b) Collect rankings from respondents
- c) Prepare graphs
- d) Test reliability

Answer: b) Collect rankings from respondents

7. Garrett Ranking method converts ranks into:

- a) Percentage scores
- b) Garrett scores
- c) Frequency values
- d) Regression values

Answer: b) Garrett scores

8. Garrett score is calculated using:

- a) Mean deviation formula
- b) Percent position formula
- c) Correlation formula
- d) Regression formula

Answer: b) Percent position formula

9. The formula for Garrett's percent position is:

- a) $(R + 1) / N \times 100$
- b) $100(R_{ij} - 0.5) / N_j$
- c) $R \times N / 100$
- d) $N / R \times 100$

Answer: b) $100(R_{ij} - 0.5) / N_j$

10. In Garrett Ranking, R_{ij} represents:

- a) Total number of respondents
- b) Rank given by the respondent
- c) Mean score
- d) Standard deviation

Answer: b) Rank given by the respondent

11. N_j in Garrett's formula indicates:

- a) Number of factors
- b) Number of respondents
- c) Total number of items ranked
- d) Sample percentage

Answer: c) Total number of items ranked

12. After obtaining Garrett scores, the researcher calculates:

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

Answer: b) Mean score

13. The factor with the highest Garrett mean score is considered:

- a) Least important
- b) Most preferred factor
- c) Invalid factor
- d) Negative factor

Answer: b) Most preferred factor

14. Garrett Ranking is a type of:

- a) Non-parametric analysis technique
- b) Parametric test
- c) Probability test
- d) Regression analysis

Answer: a) Non-parametric analysis technique

15. Garrett Ranking is useful when data are collected through:

- a) Ranking scale
- b) Nominal scale only
- c) Interval measurement only
- d) Experimental design

Answer: a) Ranking scale

16. Garrett Ranking helps researchers to:

- a) Prioritize problems or factors
- b) Predict future values
- c) Measure cause and effect
- d) Find population size

Answer: a) Prioritize problems or factors

17. Which software can be used to perform Garrett Ranking analysis?

- a) SPSS
- b) MS Word
- c) PowerPoint
- d) Paint

Answer: a) SPSS

18. Garrett Ranking is commonly applied in:

- a) Consumer preference studies
- b) Chemical experiments
- c) Physics calculations
- d) Mathematical proofs

Answer: a) Consumer preference studies

19. The output of Garrett Ranking analysis helps in:

- a) Decision making
- b) Data entry
- c) Random sampling
- d) Questionnaire design only

Answer: a) Decision making

20. Garrett Ranking Method is best suited for analyzing:

- a) Preference order of multiple factors
- b) Relationship between two variables
- c) Difference between two means
- d) Data distribution

Answer: a) Preference order of multiple factors

4.6 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.

Questions: Do you ever feel depressed because of work?

S. No	Particulars	Rank
1	Lack of career growth	
2	Lack of support from supervisors	
3	Lack of proper working condition	
4	Work life imbalance	
5	Health issues	

Explanation

These factors represent the major issues that can negatively influence employees' job satisfaction, motivation, performance, and retention. Organizations should address these concerns by providing career development opportunities, supportive leadership, safe and healthy working conditions, work–life balance initiatives, and employee wellness programs to improve overall organizational effectiveness.

Table 12

FEELING DEPRESSED BECAUSE OF WORK

S.NO	RANK	1	2	3	4	5	TOTAL SCORE
	WEIGHTED FACTORS	5	4	3	2	1	
1	Lack of career growth	220	62	15	3	2	93.4
2	Lack of support from supervisors	62	186	31	13	10	78.86
3	Lack of proper working condition	-	-	-	19	283	21.2
4	Work life imbalance	110	142	-	50	-	80.93
5	Health issues	14	22	125	58	83	48.4

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

Lack of career growth

$220*5+62*4+15*3+3*2+2*1=1401/15=93.4$

Lack of support from supervisors

$62*5+186*4+31*3+13*2+10*1=1183/15=78.86$

Lack of proper working condition

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

Work life imbalance

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

Health issues

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

Inference

The weighted average analysis indicates that **lack of career growth (93.40)** is the most critical issue faced by respondents, followed by **work–life imbalance (80.93)** and **lack of support from supervisors (78.86)**. These findings suggest that organizations should prioritize providing career development opportunities, promoting work–life balance, and strengthening supervisory support to improve employee satisfaction and retention. In contrast, **health issues (48.40)** have a moderate impact, while **lack of proper working conditions (21.20)** is the least influential factor among those studied.

Multiple Choice Questions (MCQs) on the Weighted Average Method .

1. The Weighted Average Method is mainly used for:

- A. Depreciation of assets
- B. Inventory valuation
- C. Bank reconciliation
- D. Payroll accounting

Answer: B. Inventory valuation

2. Under the Weighted Average Method, the cost of inventory is:

- A. Based on the oldest purchase price
- B. Based on the latest purchase price
- C. Based on the average cost of all units available
- D. Based on market value

Answer: C. Based on the average cost of all units available

3. The weighted average cost per unit is calculated by:

- A. $\text{Total sales} \div \text{Total units sold}$
- B. $\text{Total cost of goods available} \div \text{Total units available}$
- C. $\text{Total purchases} \div \text{Number of suppliers}$
- D. $\text{Opening stock} \div \text{Closing stock}$

Answer: B. Total cost of goods available $\div$ Total units available

4. Which inventory valuation method smooths out price fluctuations?

- A. FIFO
- B. LIFO
- C. Weighted Average
- D. Specific Identification

Answer: C. Weighted Average

5. Weighted Average Method is suitable when:

- A. Inventory items are identical
- B. Every item is unique
- C. Goods cannot be mixed
- D. Assets are depreciated

Answer: A. Inventory items are identical

6. Which of the following is not required to calculate weighted average cost?

- A. Total cost of inventory
- B. Total quantity available
- C. Selling price
- D. Purchase quantity

Answer: C. Selling price

7. If prices are rising, the weighted average cost usually falls:

- A. Between FIFO and LIFO costs
- B. Below FIFO only
- C. Above LIFO only
- D. Equal to selling price

Answer: A. Between FIFO and LIFO costs

8. Weighted Average Method is accepted under:

- A. Accounting standards for inventory valuation
- B. Income tax only
- C. Banking regulations only
- D. Insurance rules only

Answer: A. Accounting standards for inventory valuation

9. Weighted Average Method assumes:

- A. Latest goods are sold first
- B. Oldest goods are sold first
- C. Goods are issued at average cost
- D. Goods are sold at market value

Answer: C. Goods are issued at average cost

10. Weighted Average Cost changes whenever:

- A. Goods are sold
- B. New inventory is purchased (Perpetual system)
- C. Cash is received
- D. Expenses are paid

Answer: B. New inventory is purchased (Perpetual system)

11. Which inventory system commonly recalculates weighted average after each purchase?

- A. Periodic system
- B. Perpetual system
- C. Cash system
- D. Double-entry system

Answer: B. Perpetual system

12. Under the periodic inventory system, weighted average is calculated:

- A. After every sale
- B. At the end of the accounting period
- C. Daily
- D. Weekly

Answer: B. At the end of the accounting period

13. If total inventory cost is \$6,000 and total units are 300, the weighted average cost per unit is:

- A. \$18
- B. \$20
- C. \$22
- D. \$24

Answer: B. \$20

14. Which method reduces the effect of extreme purchase prices?

- A. FIFO
- B. LIFO
- C. Weighted Average
- D. Retail Method

Answer: C. Weighted Average

15. Closing inventory under the weighted average method is valued at:

- A. Oldest purchase cost
- B. Latest purchase cost
- C. Average cost per unit $\times$ Units in closing stock
- D. Selling price

Answer: C. Average cost per unit $\times$ Units in closing stock

16. Cost of Goods Sold (COGS) is calculated using:

- A. Selling price only
- B. Average cost per unit $\times$ Units sold
- C. Purchase price of the last batch only
- D. Market value of inventory

Answer: B. Average cost per unit $\times$ Units sold

17. Which method is easiest when inventory items are mixed together?

- A. Specific Identification
- B. FIFO
- C. Weighted Average
- D. LIFO

Answer: C. Weighted Average

18. The weighted average method provides:

- A. Stable inventory costs
- B. Highest profit always
- C. Lowest inventory value always
- D. No inventory valuation

Answer: A. Stable inventory costs

19. Which of the following is an advantage of the Weighted Average Method?

- A. Simple to apply
- B. Reduces the impact of price fluctuations
- C. Suitable for similar inventory items
- D. All of the above

Answer: D. All of the above

20. Which statement about the Weighted Average Method is correct?

- A. It ignores purchase costs.
- B. It uses only the first purchase price.
- C. It assigns an average cost to all units available.
- D. It values inventory at selling price.

Answer: C. It assigns an average cost to all units available.

ABOUT THE AUTHORS



Dr. T. Suguna

Dr. T. Suguna is an Assistant Professor of Management Studies at Virudhunagar Hindu Nadars' Senthikumara Nadar College (Autonomous), with 13 years of teaching experience in Marketing and Human Resource Management. She has published 20 research papers and presented over 50 papers at national and international conferences.



She has served as a Resource Person, organized events like MOTO'23, and convened an International Conference in 2024. Her awards include the International Distinguished Teacher Award (2023) and Academic Excellence Award (2024).



Dr. Suguna authored *Artificial Intelligence and Business Analytics: A Transformative Force in Industry 5.0* (2024) and has published two ISBN books, *Ranking and Ordinal Techniques* and *First Step in Computing* (2025).



She has been recognized by JCI Virudhunagar and is scheduled to present her work locally in 2025.



Dr. A. Geethanjali

Dr. A. Geethanjali is the Assistant Professor and Head of the Department of Commerce at Sri Parasakthi College for Women, Courtallam, in Tenkasi District. She has 16 years of teaching experience at both undergraduate and postgraduate levels. Her areas of expertise include Marketing and Management Accounting.



She has published three research papers in reputed journals and has presented over ten papers at national and international conferences.



In addition to her academic achievements, she has served as a resource person at various colleges.



She has also acted as the Convenor for Calibre Quest, as well as for national and state-level seminars.



Dr. BGR
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