UNIT - V

Interpretation

- Interpretation refers to the task of drawing inferences from the collected facts after an analytical and/or experimental study.

- It is a search for broader meaning of research finding .

- Interpretation is the device through which the factors that seem to explain what has been observed by researcher in the course of the study can be better understood and it also provides a theoretical conception which can serve as a guide for further researchers

- The task of interpretation has two major aspects:

i. the effort to establish continuity in research through linking the result of a given study with those of another.

ii. The establishment of some explanatory concept.

Why Interpretation

- ➢ Usefulness and utility of research findings lie in proper interpretation
- To understand the abstract principle that works beneath the findings
- Establishment of explanatory concepts
- To explain the real significance i.e. why his findings are what they are.
- Interpretation is required for hypothesis results.

Technique of Interpretation

- Reasonable explanation of the relations and interpret the lines of relationship in terms of the underlying processes.

- Extraneous information must be considered

- Consultation with experts

- Consider all relevant factors affecting the problem to avoid false generalization

Interpreting data

- Adding meaning to information by making connections and comparisons and exploring causes and consequences

| Relevance of finding | Reasons for finding | Consider other data | Conduct further research |

Interpretation – relevance of finding

- Adding meaning to information by making connections and comparisons and exploring causes and consequences
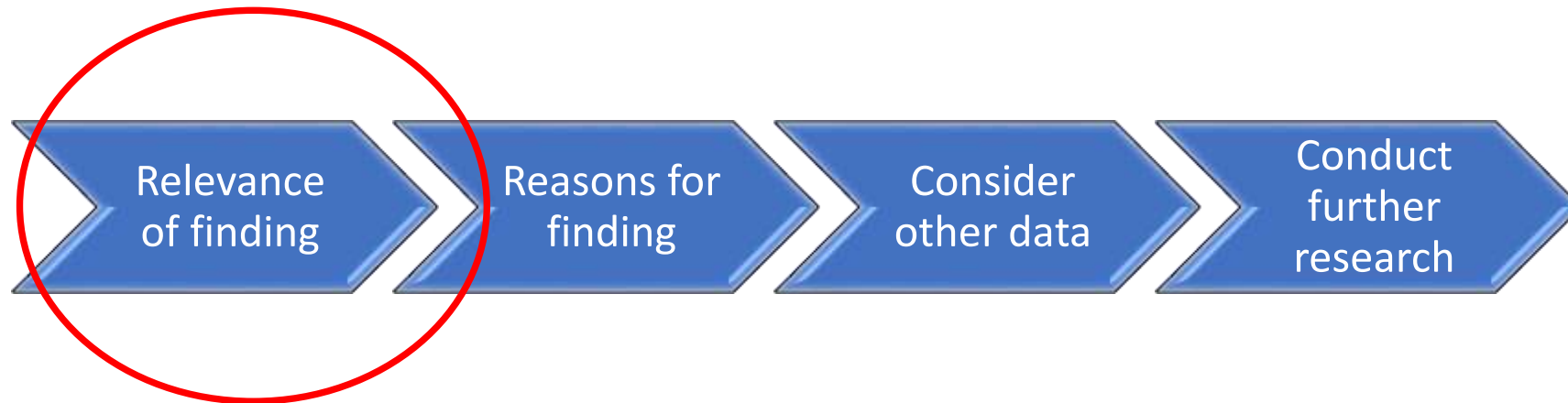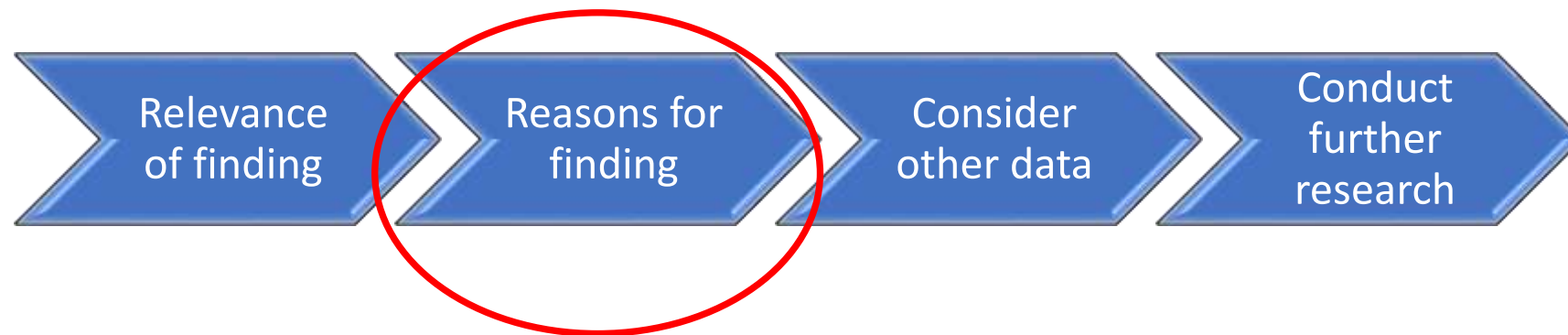
Interpretation – relevance of finding

- Does the indicator meet the target?

- How far from the target is it?

- How does it compare (to other time periods, other facilities)?

- Are there any extreme highs and lows in the data?

Interpretation – possible causes?

- Supplement with expert opinion
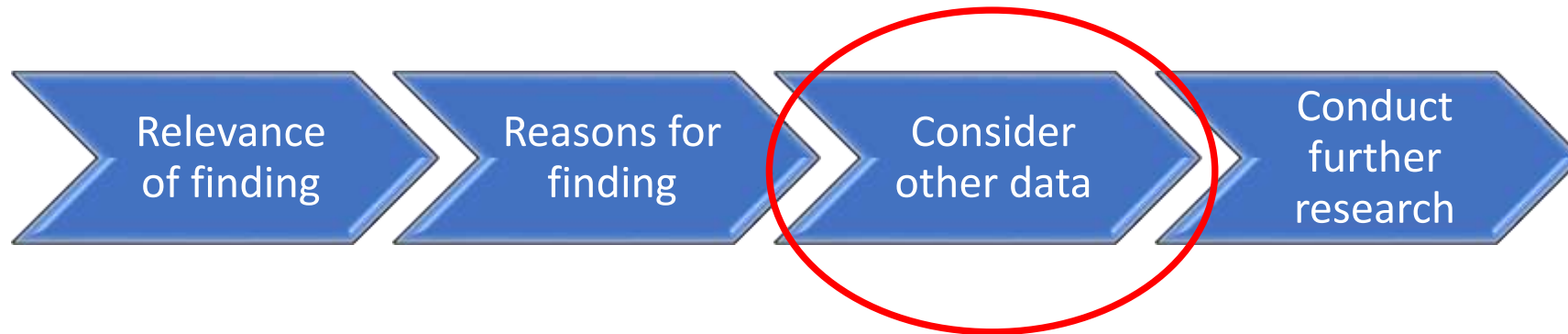 - Others with knowledge of the program or target population

Interpretation – consider other data

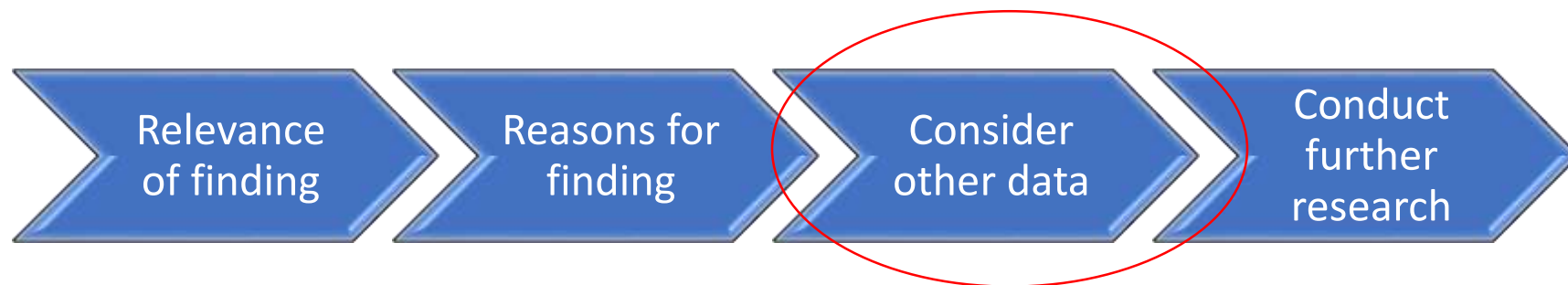Use routine service data to clarify questions

- Calculate nurse-to-client ratio, review commodities data against client load, etc.

Use other data sources

| Relevance of finding | Reasons for finding | Consider other data | Conduct further research |

Interpretation – other data sources

- Situation analyses
- Demographic and health surveys
- Performance improvement data

Interpretation – conduct further research

- Data gap ➡️ conduct further research
- Methodology depends on questions being asked and resources available

Relevance of finding	Reasons for finding	Consider other data	Conduct further research
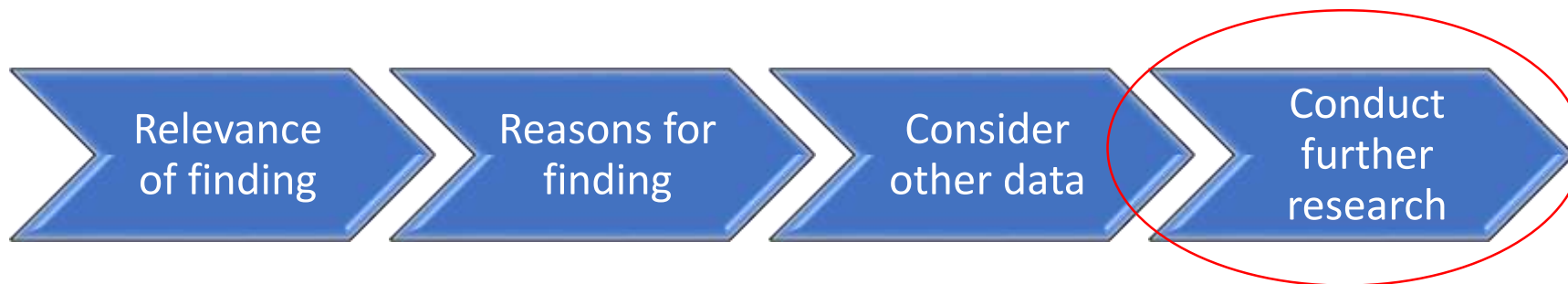
Precautions in Interpretation

Researcher must pay attention to the following points for correct interpretation:

- Data are appropriate
- Good Homogeneity
- Proper Analysis
- Avoid Errors

Example

DATA INTERPRETATION AND ANALYSIS - COMPETENCY 0009
- Interpret information from line graphs, bar graphs, and pie charts.
- Interpret data from tables.
- Recognize appropriate representations of various data in graphic form.

Example 1: The table below shows the distribution of students' major areas of study in a particular college. Which of the following pie charts could be used to represent this data?

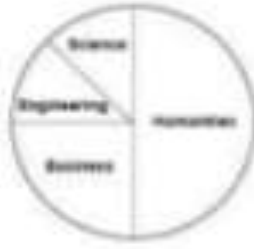| Major Area of Study	Number of Students
Humanities	12,000
Business	6,000
Engineering	4,000
Science	2,000
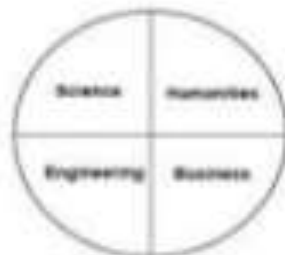
Report Writing

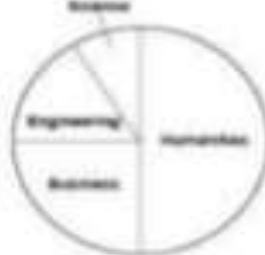# Meaning:-

- *"A report is a statement of the result of an investigation or of any matter on which definite information is required."*

(Oxford English Dictionary)

Report Format and Organization

- Report generally include these sections in this order:
  - Abstract
  - Introduction/Objective
  - Background
  - Methodology/Procedure
  - Results
  - Discussion
  - Conclusion
  - Recommendations

Report Format and Organization

- Abstract/Executive Summary
  - Always comes first
  - Is brief (one paragraph-one page)
    - Past tense
  - Content:
    - States research problem or main objective
    - Indicate the methodology used
    - Presents the main findings and conclusions

Report Format and Organization

- Introduction/Objective
  - Explains the research problem and its context
    - Explains importance of the problem (why does it matter?)
    - Applications of the experiment or theory
    - Explains reason and goals for study
    - Motivation

Report Format and Organization

- ## Background
  - Includes the theory for the experiments
  - Any equations required for the calculations
    - Each equation should be numbers
  - Included references

Report Format and Organization

- Methodology/Procedure
  - Is in past tense and passive voice (3rd person)
    - Do not use "We", "I", or "You"
  - Describes the experimental procedure and data collection
  - Included a schematic/diagram of the apparatus
  - Write in complete sentence
  - "The tank was filled with 5 L of water"
  - **NOT** "Fill tank with 5L of water"
    - Incomplete sentence and present tense

Report Format and Organization

- Results
  - State the results in the text before presenting any graphs, figures or tables.
    - Text points out the most significant portions of research findings
    - Indicates key trends or relationships
    - Highlights expected and/or unexpected findings
  - Visual representation of results:
    - Graphs, tables or figures
    - Included error analysis
  - Past tense (these are results you <u>measured, calculated</u> or <u>observed</u>)

Report Format and Organization

- Discussion
  - Why did you observed what you observed?
  - Explanation for Results:
    - Comments on unexpected results, offering hypothesis for them
  - Comparison to literature
    - Does your research confirm previous studies? Deviate from them?

Report Format and Organization

- Conclusion
  - Discusses:
    - What was learned through research
    - Strengths and weakness of study
    - Possible applications of study (how it can be used)
    - Recommendations
- Recommendation
  - What would you do differently?
  - Any changes would you recommend for the experiment

Charts and graphs

- Charts and graphs are used to portray:
  - Trends, relationships, and comparisons
- The most informative are simple and self-explanatory
- Charts and graphs
  - Bar chart: comparisons, categories of data
  - Line graph: display trends over time
  - Pie chart: show percentages or proportional share

Language and Vocabulary

- Reports should be easily accessible
  - Be straightforward and concise
  - Use simple terms, not jargon
  - Keep sentences short and simple (20 words max)
  - No common phases (be technical)
    - "in the ballpark"
  - Be specific and not general
    - Not "close" or "like" or "pretty" or "roughly"

Source Documentation

- Cite sources whenever you are quoting, paraphrasing, or summarizing work that is not your own
  - Quote directly is discouraged
  - DO NOT COPY
- Sources include:
  - Books
  - Journal, magazine, or newspaper articles
  - Interviews
  - Conference Proceedings
  - Lectures

Source Documentation

- Citing
  - Shows your credibility as a researcher
  - Gives proper credit to authors and researchers
  - Protects you from accusations of plagiarism

Types of report

Research reports vary greatly in length and type. In each individual case, both the length and the form are largely dictated by the problems at hand.

Reports are usually considered as important research products. Similarly, Ph.D. theses and dissertations are also a form of report-writing, usually completed by students in academic institutions.

A *technical report* is used whenever a full written report of the study is required whether for record keeping or for public dissemination. A *popular report* is used if the research results have policy implications.

REPORT

TECHNICAL

POPULAR

TECHNICAL REPORT

- In the technical report the main emphasis is on

  (i) the methods employed,
  (ii) assumptions made in the course of the study,
  (iii) the detailed presentation of the findings including
  their limitations and supporting data.

A general outline of a technical report can be as follows:

- *Summary of results:* A brief review of the main findings just in two or three pages.
- *Nature of the study:* Description of the general objectives of study, formulation of the problem in operational terms, the working hypothesis, the type of analysis and data required, etc.
- *Methods employed:* Specific methods used in the study and their limitations. For instance, in sampling studies we should give details of sample design viz., sample size, sample selection, etc.

TECHNICAL REPORT…

- ***Data:*** Discussion of data collected, their sources, characteristics and limitations. If secondary data are used, their suitability to the problem at hand be fully assessed. In case of a survey, the manner in which data were collected should be fully described.

- ***Analysis of data and presentation of findings:*** The analysis of data and presentation of the findings of the study with supporting data in the form of tables and charts be fully narrated. This, in fact, happens to be the main body of the report usually extending over several chapters.

- ***Conclusions:*** A detailed summary of the findings and the policy implications drawn from the results be explained.

- ***Bibliography:*** Bibliography of various sources consulted be prepared and attached.

TECHNICAL REPORT...

- *Technical appendices:* Appendices be given for all technical matters relating to questionnaire, mathematical derivations, elaboration on particular technique of analysis and the like ones.
- *Index:* Index must be prepared and be given invariably in the report at the end.

It should, however, be remembered that even in a technical report, simple presentation and ready availability of the findings remain an important consideration and as such the liberal use of charts and diagrams is considered desirable.

- Method Employed
- Assumption made
- Presentation of finding
  - Advantages
  - Disadvantages
- Supporting Data

Popular report

- The popular report is one which gives emphasis on simplicity and attractiveness.

- The simplification should be sought through clear writing, minimization of technical, particularly mathematical, details and liberal use of charts and diagrams.

- Attractive layout along with large print, many subheadings, even an occasional cartoon now and then is another characteristic feature of the popular report.

- Report emphasis is given on practical aspects rand policy implications.

- We give below a general outline of a popular report.

- *The findings and their implications:* Emphasis in the report is given on the findings of most practical interest and on the implications of these findings.

- *Recommendations for action:* Recommendations for action on the basis of the findings of the study is made in this section of the report.

Popular report...

- ***Objective of the study:*** A general review of how the problem arise is presented along with the specific objectives of the project under study.

- ***Methods employed:*** A brief and non-technical description of the methods and techniques used, including a short review of the data on which the study is based, is given in this part of the report.

- ***Results:*** This section constitutes the main body of the report wherein the results of the study are presented in clear and non-technical terms with liberal use of all sorts of illustrations such as charts, diagrams and the like ones.

Popular report...

- *Technical appendices:* More detailed information on methods used, forms, etc. is presented in the form of appendices. But the appendices are often not detailed if the report is entirely meant for general public.

There can be several variations of the form in which a popular report can be prepared. The only important thing about such a report is that it gives emphasis on simplicity and policy implications from the operational point of view, avoiding the technical details of all sorts to the extent possible.

- Mainly two types of report :

(a) **Thesis:** A long essay or dissertation involving personal research , written as part of a university Doctorate degree.

(b) **Dissertation**: A long essay, especially one written for a university degree or diploma.

Different steps in writing report

1. **Logical analysis of the subject matter:-**

- Primarily concerned with the development of a subject.

- There are two ways in which to develop a subject:
  (a) logically:
  (b) chronologically:

Contd..

2.Preparation of the final outline

- Outlines are the framework upon which long written works are constructed.

- They are an aid to the logical organization of the material and a reminder of the points to be stressed in the report."

Contd..

3. Preparation of the rough draft

- This follows the logical analysis of the subject and the preparation of the final outline.

- Such a step is of utmost importance for the researcher now sits to write down what he has done in the context of he is research study.

Contd..

4. Rewriting and polishing of the rough draft.

- This step happens to be most difficult part of all formal writing.

- "In addition the researcher should give due attention to fact that in his rough draft he has been consistent or not. He should the mechanics of writing- grammer, spelling and usage.

Contd...

5. Preparation of the final bibliography:-

* Next in order come the task of the preparation of the final bibliography. The bibliography ,which is generally appended to the research report.
* The bibliography should be arranged alphabetically.
* Generally this pattern of bibliography is considered convenient and satisfactory from the point of view of reader.

Contd..

6.Writing the final draft:-

- The final draft should be written in a concise and objectives style and in simple language.

- Avoiding vague expression such as a "it seems", " there may be ", and the like once.

- It must be remembered that every report should be an attempt to solve some intellectual problem and must contribute to the solution of a problem and must add to the knowledge of both the researcher and the reader.

MECHANICS OF WRITING A REPORT

1) Size And Physical Design:

- Unruled paper of standard size
- If it is in hand written than use black or blue ink.
- Margin:

    Right side: half inches.
    Left side: One or One and half
        inches.

- Header and Footer:

    One inches from the sides spaced should
be left.

2) Layout:

The layout of the research report and various types of reports have been described in this presentation earlier which should be taken as a guide for report writing in case of particular problem.

3) Treatment of quotations:

Definition or Quotations should be placed in quotation marks and double spaced forming an immediate part of the text.

4) Footnotes:

Footnotes serves two purposes:

a) Page Number:

There should be page number in the report, if single side than page number page number should be written in centre or at the right side at the bottom of the page.

b) For Cross References:

Asterisk(*) sign may be used to prevent confusions and supplement note related to particular word should be mentioned below at that page.

5) Documentation style:

Regarding documentation any given work should give essential facts about the edition used. The common order may be described as under:

Regarding reference:

(1) Author's name in normal order;

(2) Title of work, underlined to indicate italics;

(3) Place and date of publication;

(4) Page number.

Example

John Gassner, *Masters of drama*, New York: Dover Publications, Inc. 1954,p. 315.

6) Abbreviations:

Following is the list of Most common abbreviations
  frequently used in report writing:

bk.,   book

art.,   article

ch.,   chapter

ed.,   editor

ex.,   example

ill.,   illustration

MS.,   Manuscripts

pp   page

post   after

7)Use of statistics, charts and graphs:

Statistics are usually presented in the form of tables, charts bars and line-graphs and pictograms. Such presentation should be self explanatory and complete it in itself.

8) The final draft:

Revising and rewriting the rough draft of the report should be done with great care before writing the final draft. For the purpose, the researcher should put to himself questions like:

a) Are the sentences written in the report clear ?
b) Are they grammatically correct ?
c) Do they say what is meant ?
d) Do the various points incorporated in report fit logically ?

On these questions we do final drafting.

9) Bibliography:

It is list of writings with time and place of publication.

10) Preparation of Index:

At the end of the report, an index should be always prepared.

It acts good guide, to the reader.

Index may be prepared of 3 types:

   a) Author Index
   b) Subject Index
   c) Content Index

PLAGIARISM

OFFICIAL DEFINITION

To plagiarize (verb):

▶ to use the words or ideas of another person as if they were your own words or ideas

▶ to steal and pass off (the ideas or words of another) as one's own : use (another's production) without crediting the source

▶ to commit literary theft : present as new and original an idea or product derived from an existing source

What is plagiarism?

- the copying from a book, article, notebook, video, or other source material, whether published or unpublished, without proper credit through the use of quotation marks, footnotes, and other customary means of identifying sources, or passing off as one's own the ideas, words, writings, programs, and experiments of another, **whether or not such actions are intentional or unintentional."**

WHAT DOES PLAGIARISM LOOK LIKE?
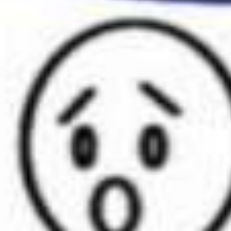
► Copying someone's work
► Citing a source improperly
► Failure to cite a source
► Creation of false sources
► Turning in another person's work as your own

Types of plagiarism

- **Word for word (Direct, Text)**
- **Mosaic**
- **Thesaurus (*Paraphrase)***
- **Ideas**
- **Authorship**
- **Secondary sources**
- **Self**

What is cyber-plagiarism?

- Copying ideas, text, material from the web without proper accreditation

- Digital plagiarism is a term used to describe copying using computers

Creativity is fine but plagiarism is faster…

What is self-plagiarism?

- The practice of an author using portions of their previous writings on the same topic in another of their publications, without specifically citing it formally in quotes.

- This practice is widespread and at times unintentional

- Violates the copyright that has been assigned to the publisher

- No consensus whether this is scientific misconduct

Why do people plagiarize?

- Ignorance

- Lack of knowledge on the ethics of scholarly writing / poor writing skills

- Ambition, fierce competition

- Pressure from seniors

- Publish or perish system

- Faster

- Chances of getting caught or action being taken is slim
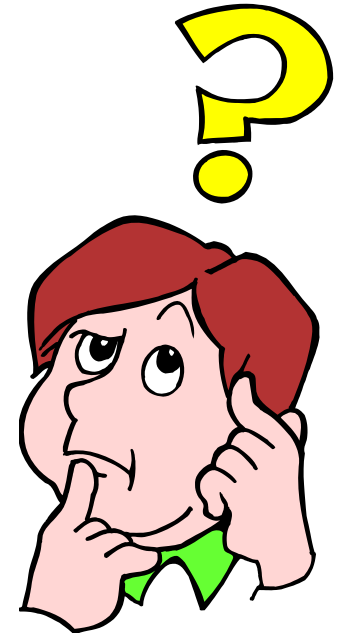
How to avoid plagiarism?

- For short quotes, use quotation marks in the sentence.

- For longer quotes indent the entire passage

- If you have used a table, chart, diagram etc., cite the source directly below with a statement that permission has been obtained.

- "All sources should be disclosed and, if large amounts of other people's written or illustrative material are to be used, permission must be sought." COPE, 1999.

Even if you change a few words here and there it is considered plagiarism

HOW TO AVOID PLAGIARISM

1. SUMMARIZE
- You must reference the original source
- Your summary should be shorter than the text you are summarizing
- You must use your own words, usually with a very limited use of quotations

HOW TO AVOID PLAGIARISM

2. Paraphrase

- You must reference the original source
- The text you produce may be shorter or longer than the original text
- You must use your own words

HOW TO AVOID PLAGIARISM

3. Quote

▶ You must reference the original source

▶ The text produced is the exact length of the original text quoted (unless ellipses are used)

▶ You must use the original author's exact words and you must put quotation marks around them

▶ You must include the page number of the source from which you borrowed the author's original language

▶ You can introduce quotes with phrases like According to Bob Jones, "xxx" or Bob Jones stated, "xxx"

HOW TO CITE

▶ Modern Language Association (MLA)

A full guide to citations can be found on their website:
https://owl.english.purdue.edu/owl/resource/7 47/01/

IN TEXT CITATION

- **Indirect Quote**: Some researchers note that "children are totally insensitive to their parents' shyness" (Zimbardo, 62).

- **Direct Quote**: Zimbardo notes that "children are totally insensitive to their parents' shyness" (62).

- **Paraphrasing/Summarizing**: Some researchers have observed that children seem unaware that their parents are considered bashful (Zimbardo, 62).

IN TEXT CITATIONS

▸ *From a Book/Journal/Article*

(Last Name(s), Page #)

If there is no author: ("Title", Page #)

▸ *From an Online Source:*

Use either the author name, or if the page has no known author, article title, in parentheses

(Last Name) or ("Article Title")

▸ If you feel it is unclear you may also cite the database

Example: (Last Name, *NYTimes*)

WHAT IS A WORKS CITED?

▸ A Works Cited is a list of sources that goes at the end of you paper or presentation that tells the reader all the sources you have used

▸ Formatting sources in a Works Cited is different from formatting an in text citation

▸ The list should be in alphabetical order

▸ Use this website to help you with citations

https://owl.english.purdue.edu/owl/resource/747/05/

EXAMPLES

- ► Book

Author Last Name, Author First Name. *Title of Book*. City of Publication: Publisher, Year of Publication. Medium of Publication.

- ► Essay or Chapter in Book

Author Last Name, Author First name. "*Title of Essay/Chapter*." Title of Book. Ed. Editor's Name(s). City of Publication: Publisher, Year. Page range of entry. Medium of Publication.

- ► Article

Author Last Name, Author First Name. "*Title of Article*." Title of Periodical. Day Month Year: pages. Medium of publication.

IMPORTANT REMINDERS

✓ Always double check all your citations for accuracy, proper formatting, author and page number.

✓ Make sure all your in text citations match the sources listed in the Works Cited.

✓ Anyone reading your work should be able to easily locate the original source of any material you use in your own work.

GOOD SOURCES

- ► University presses (Harvard, Cambridge)
- ► Major Publishing Houses (Penguin, Random House)
- ► Well Known Organizations (United Nations, Government websites)
- ► Well-Known Newspapers (New York Times)
- ► Well Known Media Sources (BBC, CNN)
- ► Magazines
- ► Online Journals (JSTOR)

BAD SOURCES

- Wikipedia
- Personal Blogs
- Non-credible newspapers, magazines, editorials

- Think about "bias"

THANK YOU

SPSS?

SPSS - Statistical Package for the Social Sciences

What is SPSS?

- SPSS is a comprehensive and flexible statistical analysis and data management solution.

- SPSS is a computer program used for survey authoring and deployment, data mining, text analytics, statistical analysis, and collaboration and deployment

Cont..

- SPSS can take data from almost any type of file and use them to generate tabulated reports, charts, and plots of distributions and trends, descriptive statistics, and conduct complex statistical analyses.

- SPSS is among the most widely used programs for statistical analysis in social science.

About

- Its is developed by Norman H. Nie and C. Hadlai Hull of IBM Corporation in the year 1968. It is compatible with Windows, Linux, UNIX & Mac operating systems. SPSS is among the most widely used programs for statistical analysis in social science.

Used in…

- Telecommunications,
- Banking,
- Finance,
- Insurance,
- Healthcare,
- Manufacturing,
- Retail,
- Consumer packaged goods,
- Higher education,
- Government,
- and Market research.

Features of SPSS

- It is easy to learn and use.

- It includes a full range of data. management system and editing tools.

- It provides in-depth statistical capabilities.

- It offers complete plotting, reporting and presentation features.

Getting data into SPSS

- Creating new SPSS data files
- Opening existing SPSS system files
- Importing data from an ASCII file
- Importing data from other file formats

Entering Data

DATA EDITOR

- The data editor offers a simple and efficient spreadsheet like facility for entering data and browsing the working data file.

- This window displays the content of the data file.

- One can create new data files or modify existing ones.

- One can have only one data file open at a time.

Cont..

- This editor provides two views of the data,

DATA VIEW

- Displays the actual data values or defined value labels.

VARIABLE VIEW

- Displays variable definition information, including defined variable and value labels, data type, etc..,

Editing Data

PIVOT TABLE EDITOR

☐   Output can be modified in many ways with is editor, and can create multidimensional tables.

Ex:

☐   We can edit text, swap data in rows and columns

Cont..

TEXT OUTPUT EDITOR

- Text output not displayed in pivot tables can be modified with the text output editor.

CHART EDITOR

- High-resolution charts and plots can be modified in chart windows.

Saving Data

- We need to save it and give it a name. The default extension name for saving files is '.sav'.

- Ex. SSPS.sav

- Also we can able to retrieving already saved file

Variables

□ Variable is a user defined name of Particular type of data to hold information (such as income or gender or temperature or dosage). Array of variable is a collection values of similar data types.

Variables types

1. Numeric
2. Comma
3. Dot
4. Scientific notation
5. Date
6. Custom currency
7. String

Rules for Variable Names

- Names must begin with a letter.
- Names must not end with a period.
- Names must be no longer than eight characters.
- Names cannot contain blanks or special characters.
- Names must be unique.
- Names are not case sensitive. It doesn't matter if you call your variable CLIENT, client, or CliENt. It's all *client to SPSS.*

BASIC STEPS IN DATA ANALYSIS

☐ Get Your Data Into SPSS:

We can open a previously saved SPSS data file, read a spreadsheet, database ,or text data file, or enter directly in the data editor.

☐ Select a Procedure:

Select a procedure from the menus to calculate statistics or to create a chart.

Cont..

□ Select The Variable For The Analysis:

Variables in the data file are displayed in a dialog box for the procedure.

□ Run The Procedure:

Results are displayed in the viewer.

STATISTICAL PROCEDURES

☐ After entering the data set in data editor or reading an ASCII data file, we are now ready to analyze it.

The Procedures Available are

☐ Reports

☐ Descriptive Statistics

☐ Custom Tables

☐ Compare means

☐ General Linear model (GLM)

- Correlate
- Regression
- Loglinear
- Classify
- Data Reduction
- Scale
- Non parametric tests
- Time Series
- Survival
- Multiple response.

REPORTS

   Report is a textual work made with the specific intention of relaying information or recounting certain events in a
widely presentable form

DESCRIPTIVE STATISTICS

   This provides techniques for summarizing Data with statistics, charts, and reports.

Cont..

CUSTOM TABLES

☐　　It provides attractive, flexible, displays of frequency counts, percentages and other statistics.

COMPARE MEANS

☐　　This provides techniques for testing differences among two or more means on their values for other variable.

Cont..

GENERAL LINEAR MODEL(GLM)

☐   This provides technique for testing univariate and multivariate analysis-of-variance models   including repeated measures.

CORRELATE

☐ This provides measures of association for two or more Variable measured at the interval level.

Cont..

REGRESSION

☐ This provides a variety of regression techniques , including Linear, logistic, nonlinear, weighted, and two-stage least-squares regression.

LOGLINEAR

☐ This provides general and hierarchical log-linear analsis and logit analysis.

Cont..

CLASSIFY

☐ This provides cluster and discriminant analysis

DATA REDUCTION

☐ This provides factor analysis, correspondence analysis, and optional scaling.

Cont..

SCALE

☐ This provides reliability analysis and multidimensional scaling.

NON PARAMETRIC TESTS

☐ This provides non-parametric tests for one sample, or for two and paired or Independent sample.

Cont..

TIME SERIES

   Provides exponential smoothing, autocorrelated regression, ARIMA, X11 ARIMA, seasonal decomposition, spectral analysis, and related techniques.

SURVIVAL

   This provides techniques for analyzing the time for some terminal event to occur, including Kaplan-Meier analysis and Cox regression.

MULTIPLE RESPONSE:

   This provides facilities to define and analyze multiple-response .

GRAPHS

BAR

☐   Generate a simple , clustered , or stacked bar chart of the data.

LINE

☐   Generate a simple or multiple line chart of the data.

AREA

☐   Generate a simple or stacked area chart of the data.

Example Bar Graph
Subsidiary A
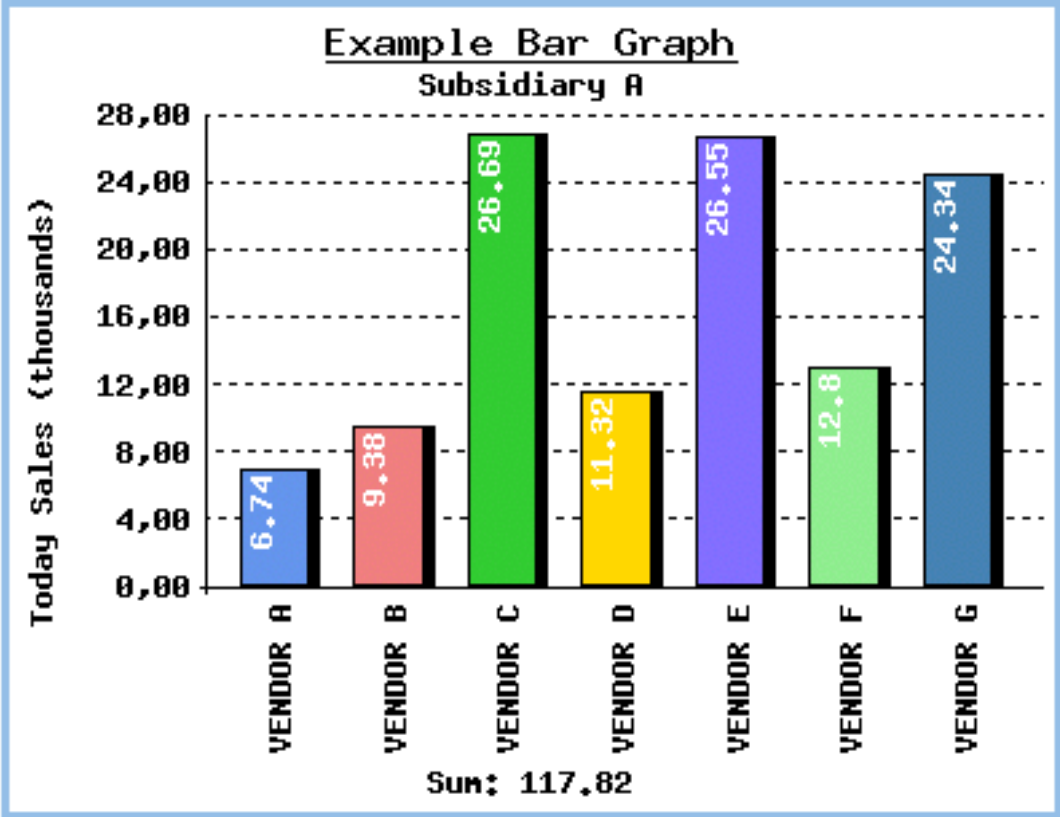
Temperatures in New York City
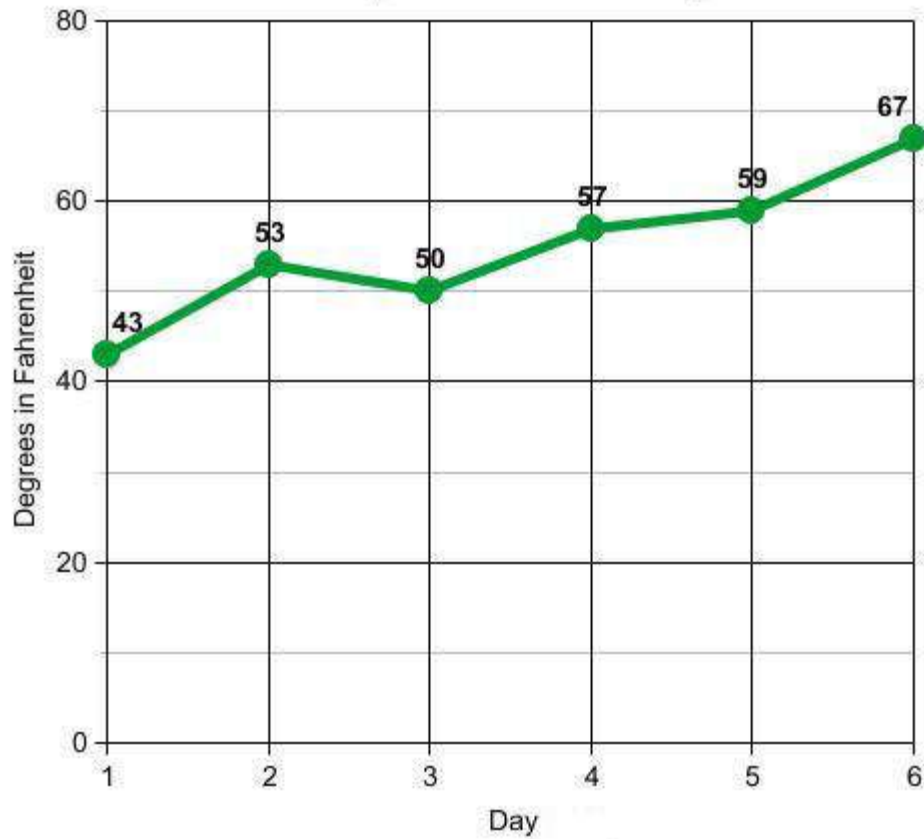
Area Chart
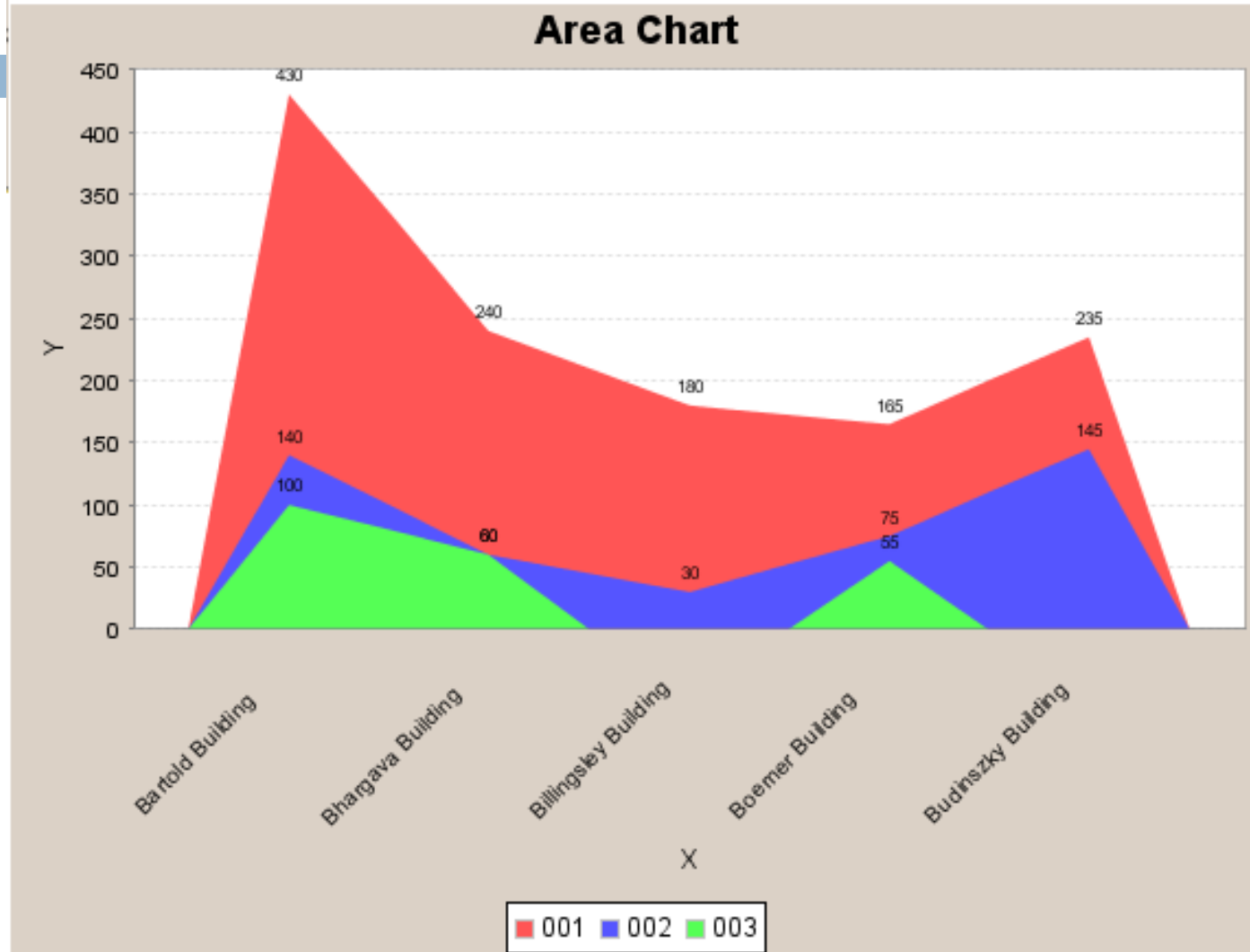
Cont..

PIE

- Generates a simple pie chart or a composite bar chart from the data.

BOXPLOT

- Generates box plot showing the median, outline, and extreme cases of individual variables.
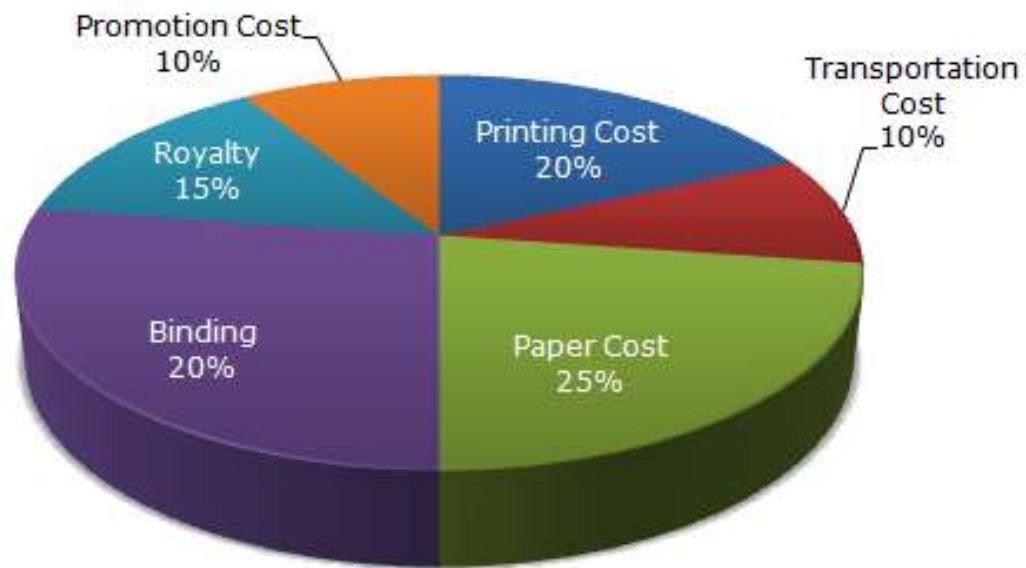
Group Box Plot
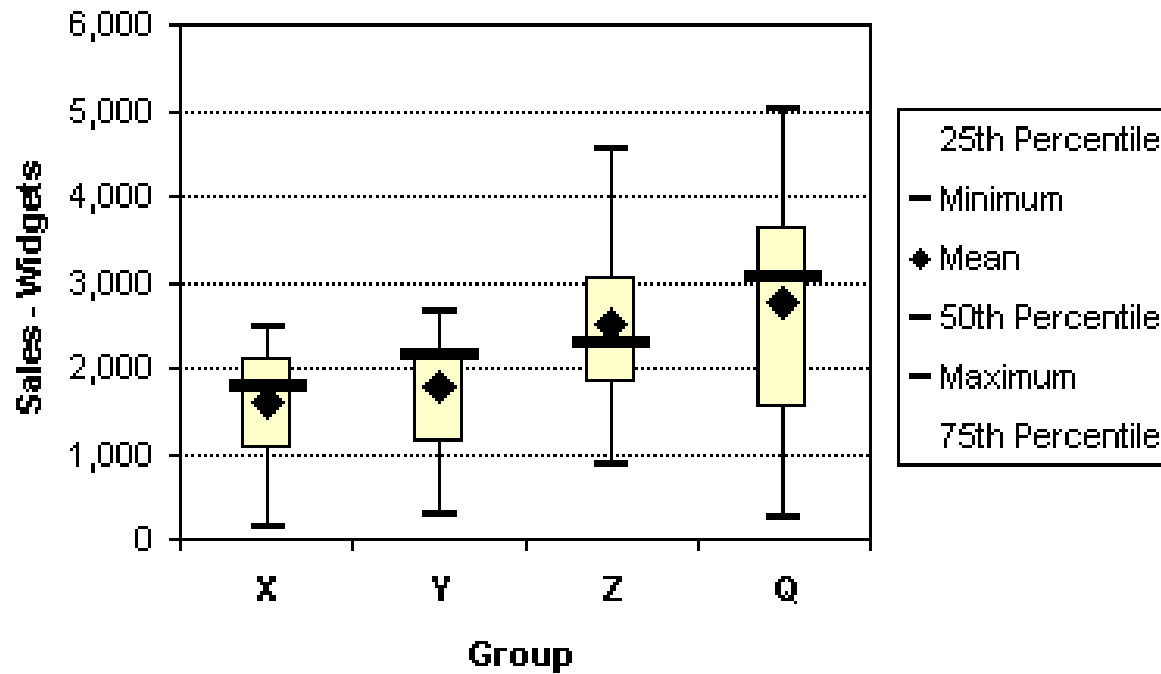
Cont..

PARETO

Generates Pareto charts, bar charts with a line superimposed showing the cumulative sum.

CONTROL

Produces the most commonly-used process-control charts.
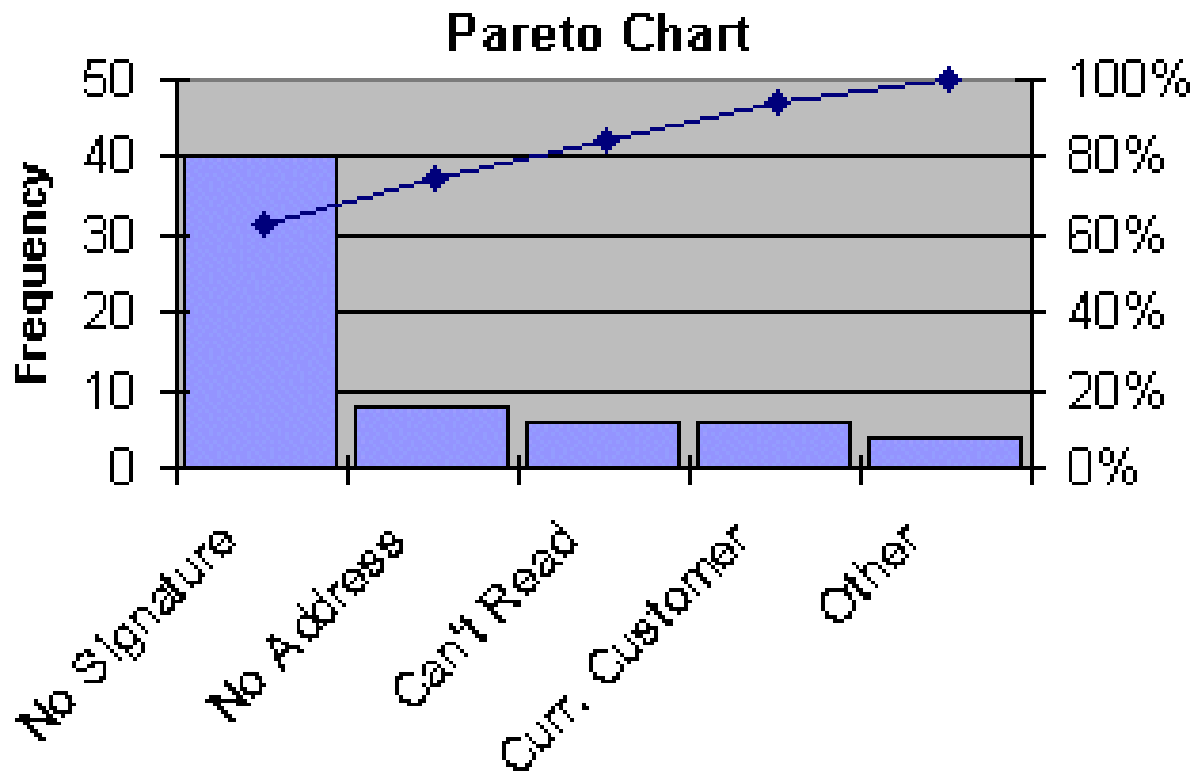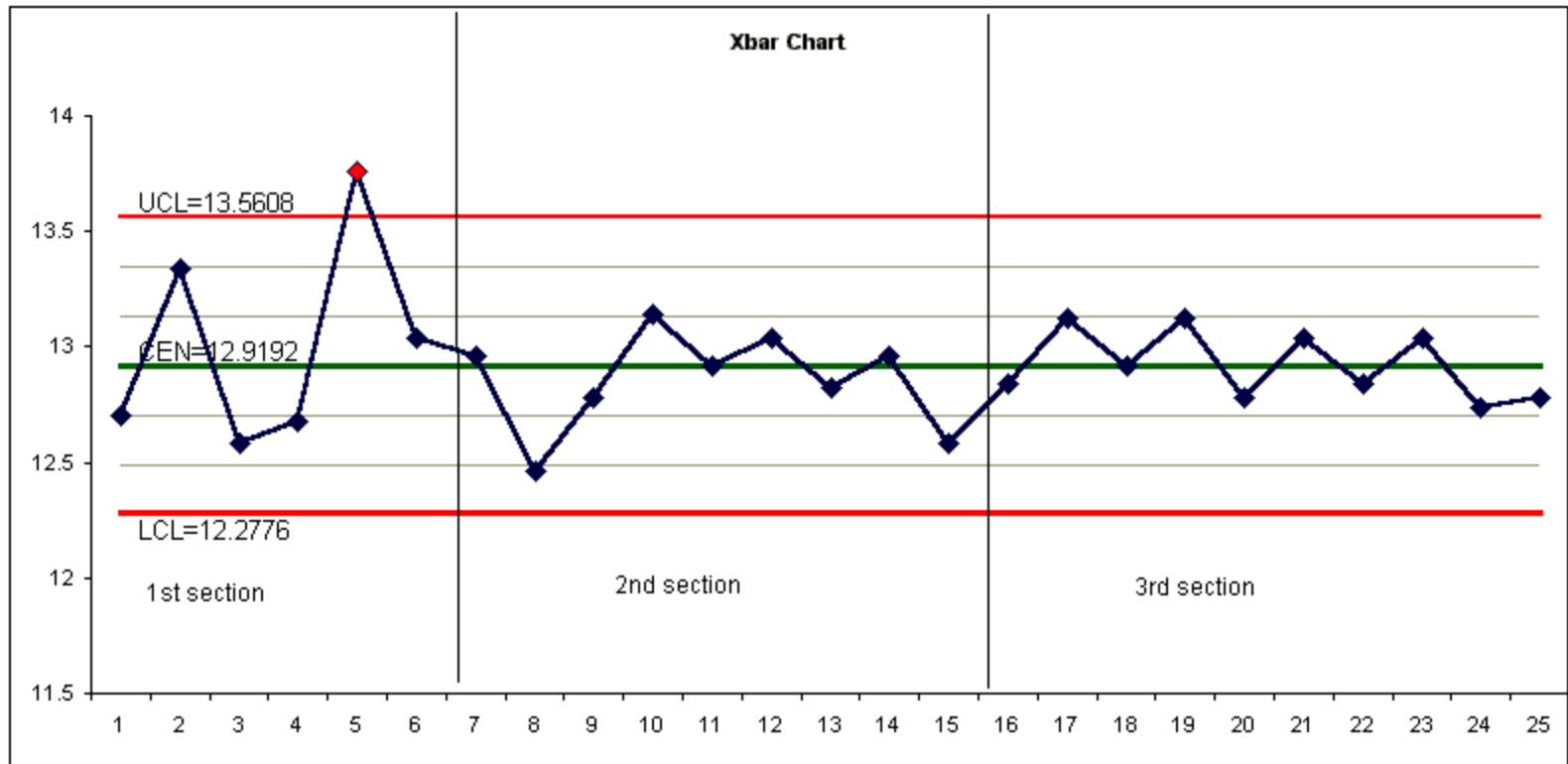
Cont..

NORMAL P-P PLOTS

The cumulative proportions of a variable's distribution against the cumulative proportions of the normal distribution.

NORMAL Q-Q PLOTS

The quantiles of a variable's distribution against the quantiles of the normal distribution.

SEQUENCE

Produces a plot of one or more variables by order in the file, suitable for examining time-series data.

Normal P-P Plot of Regression Standardized Residual

Dependent Variable: y
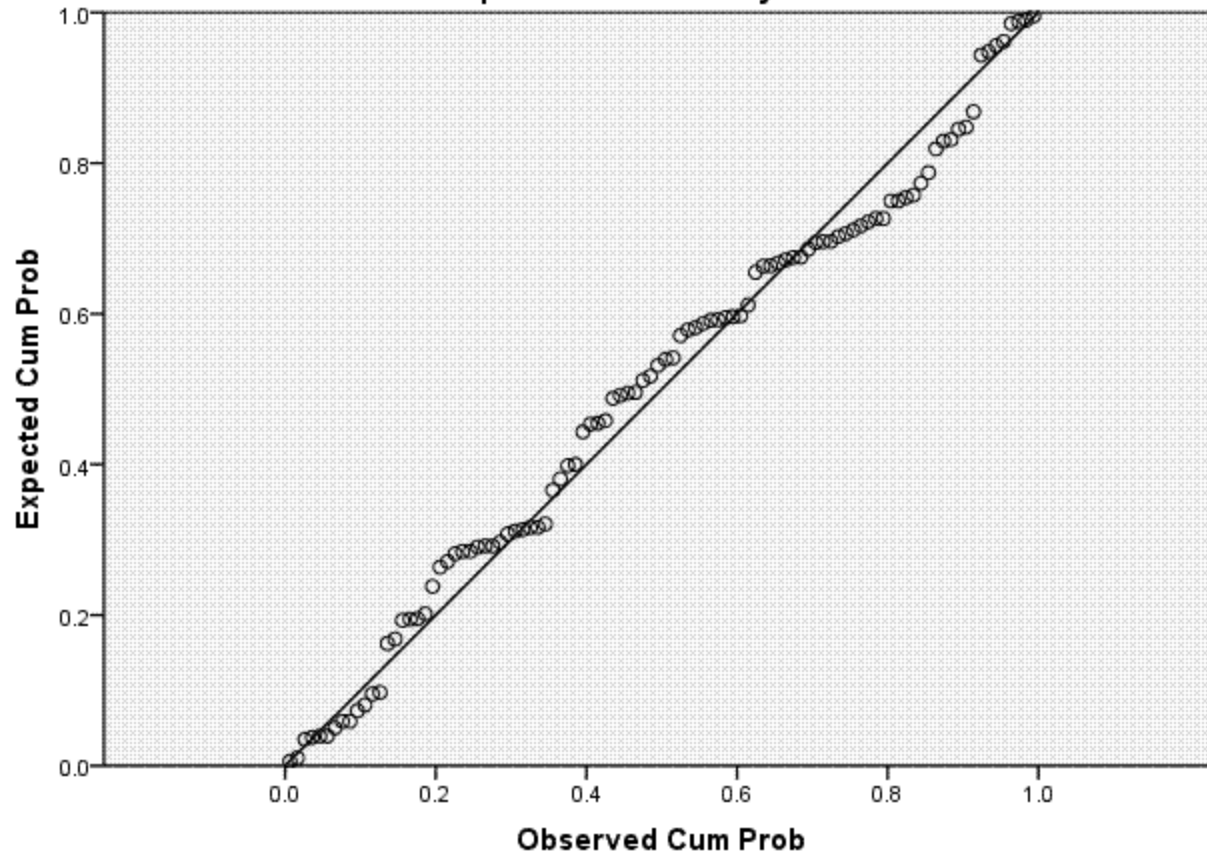
Normal Q-Q Plot of ethnocentrism scale
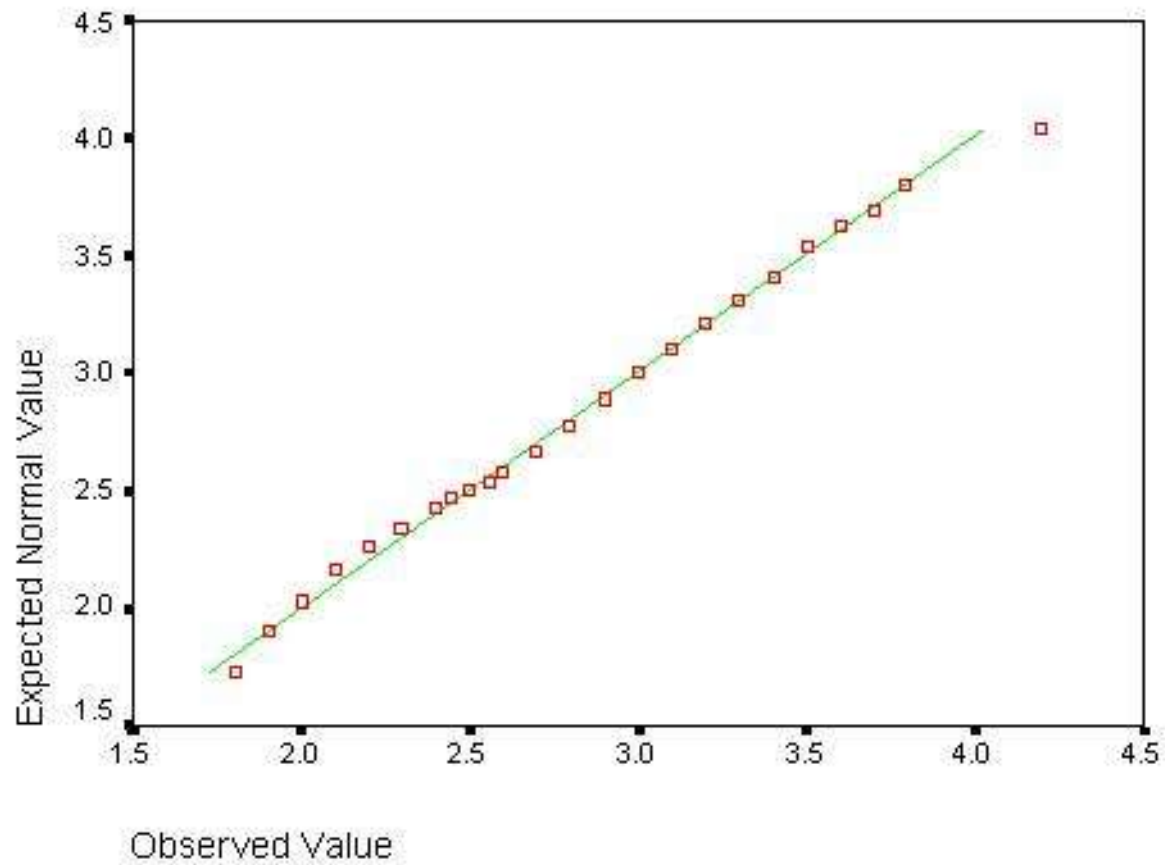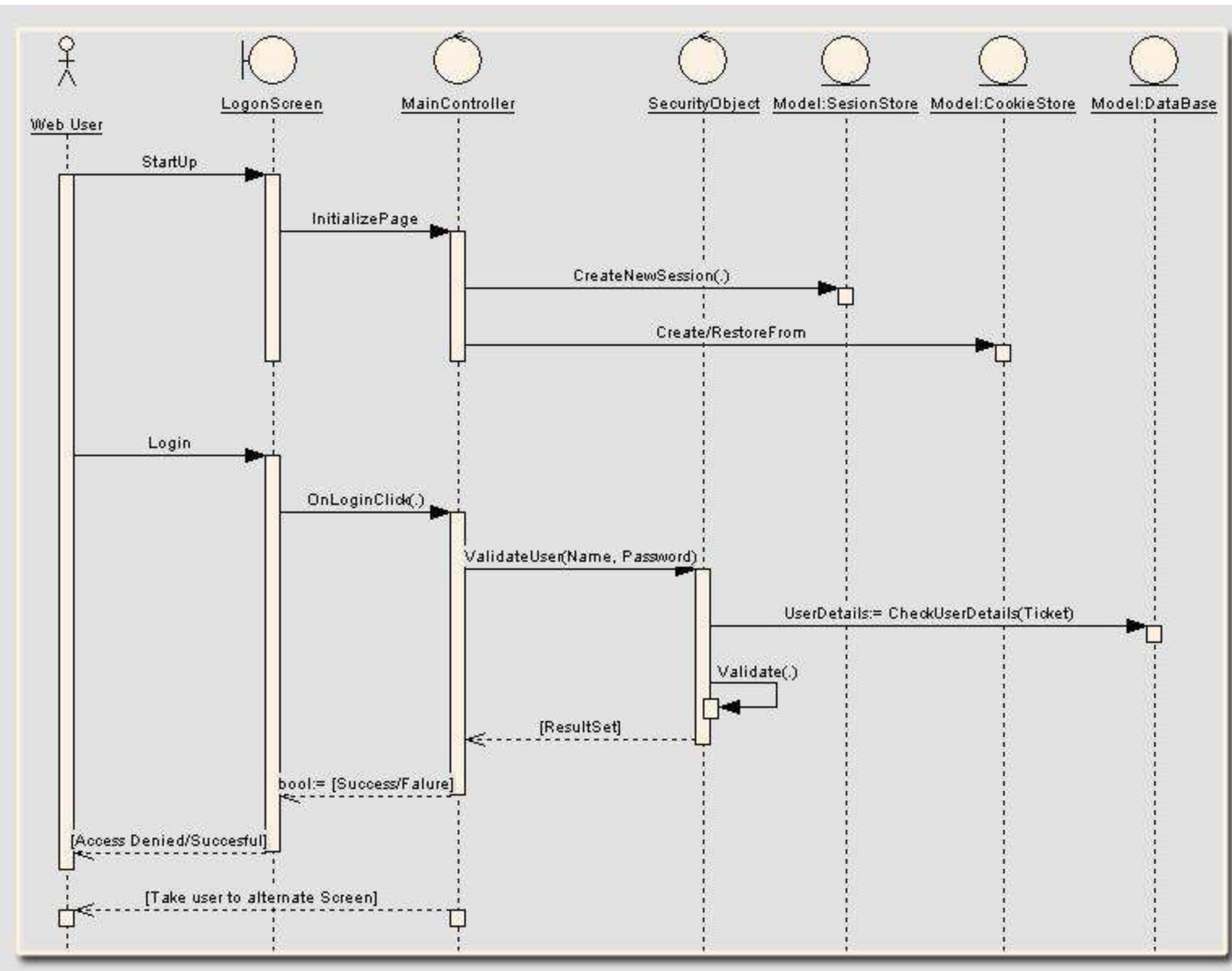
TIME SERIES: AUTOCORRELATIONS

Calculates and plots the autocorrelation function (ACF) and partial autocorrelation function of one or more series to any specified number of lags, displaying the Box-Ljung statistic at each lag to test the overall hypothesis that the ACF is zero at all lags.
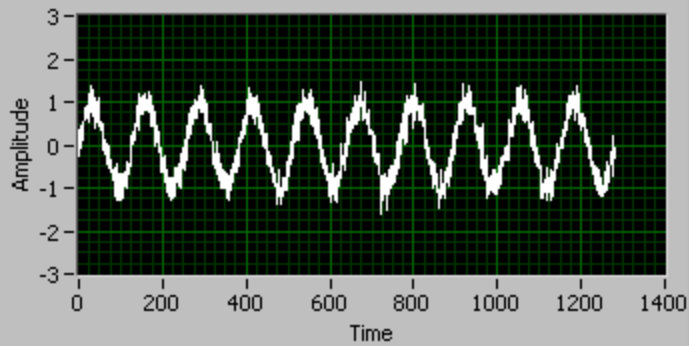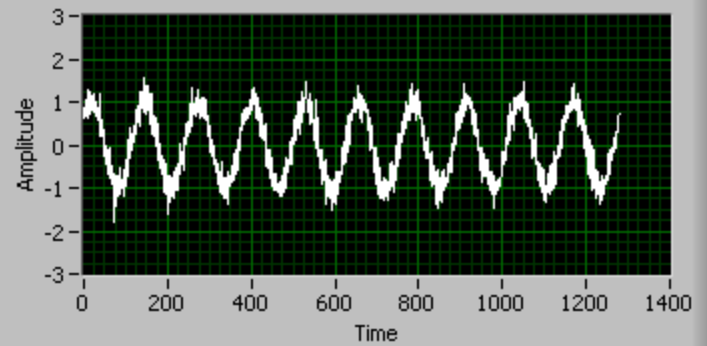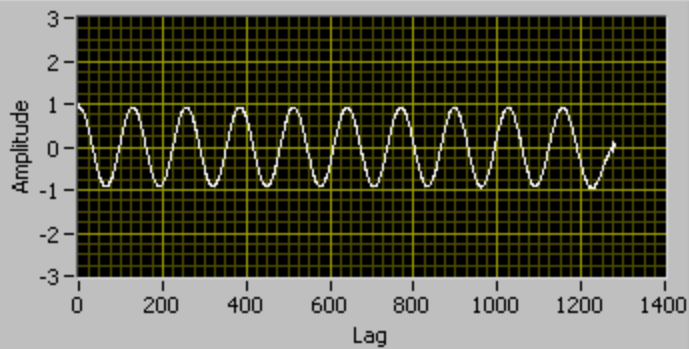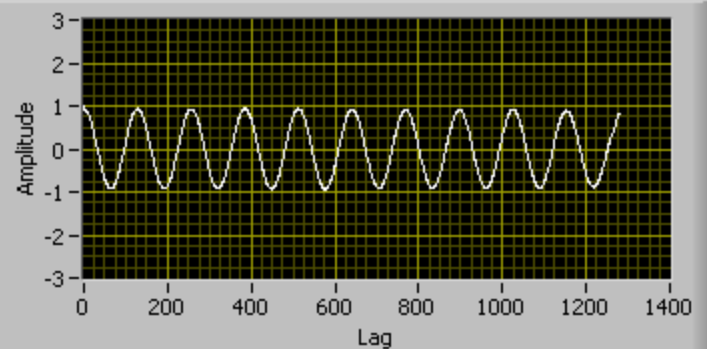
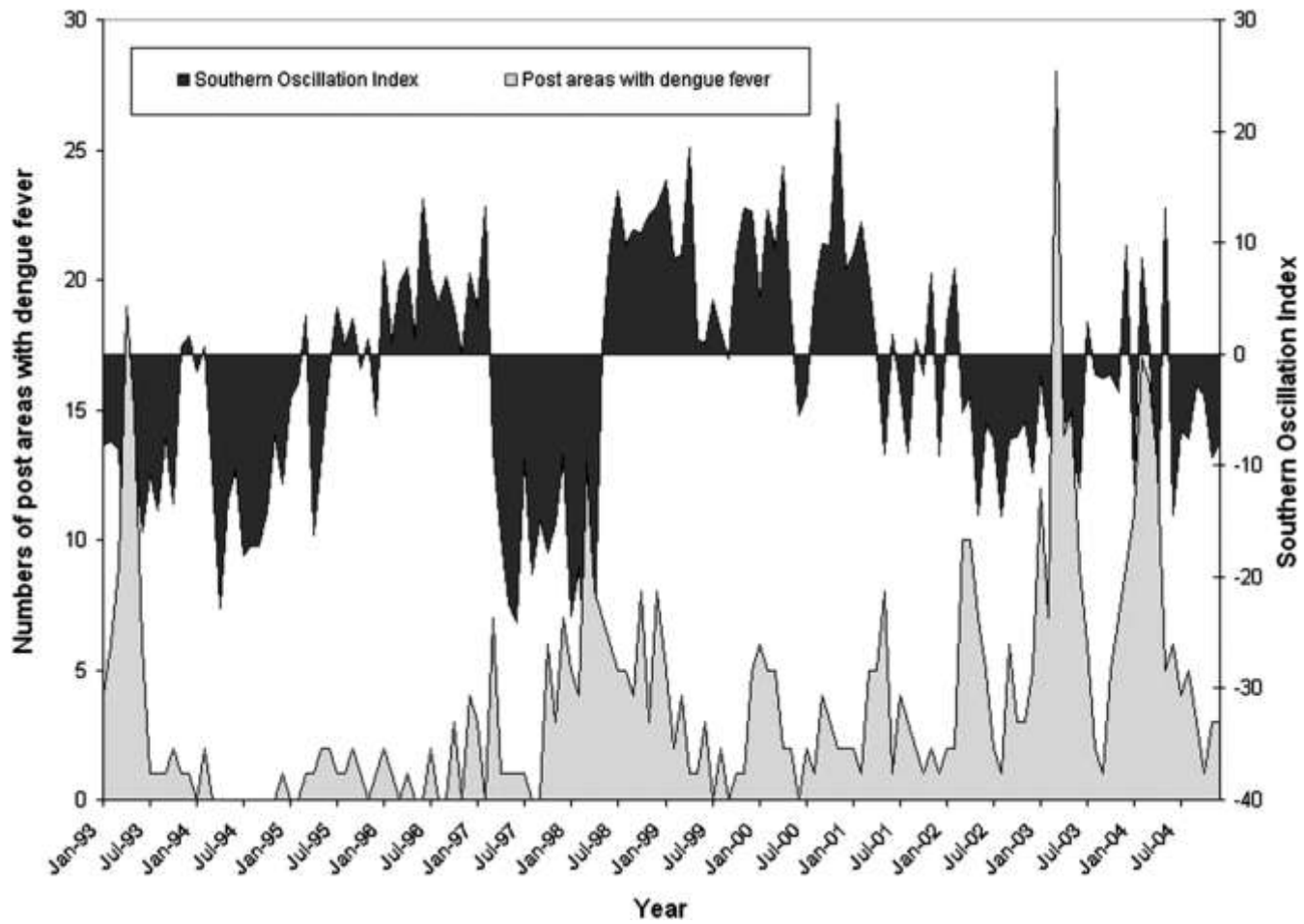## TIME SERIES: CROSS-CORRELATIONS

Calculates and plots the cross-correlation function of two or more series for positive, negative, and zero lags.

TIME SERIES: SPECTRAL

Calculates and plots univariate or bivariate periodograms and spectral density functions, which express variation in a time series as the sum of a series of sinusoidal components. It can optionally save various components of the frequency analysis as new series.
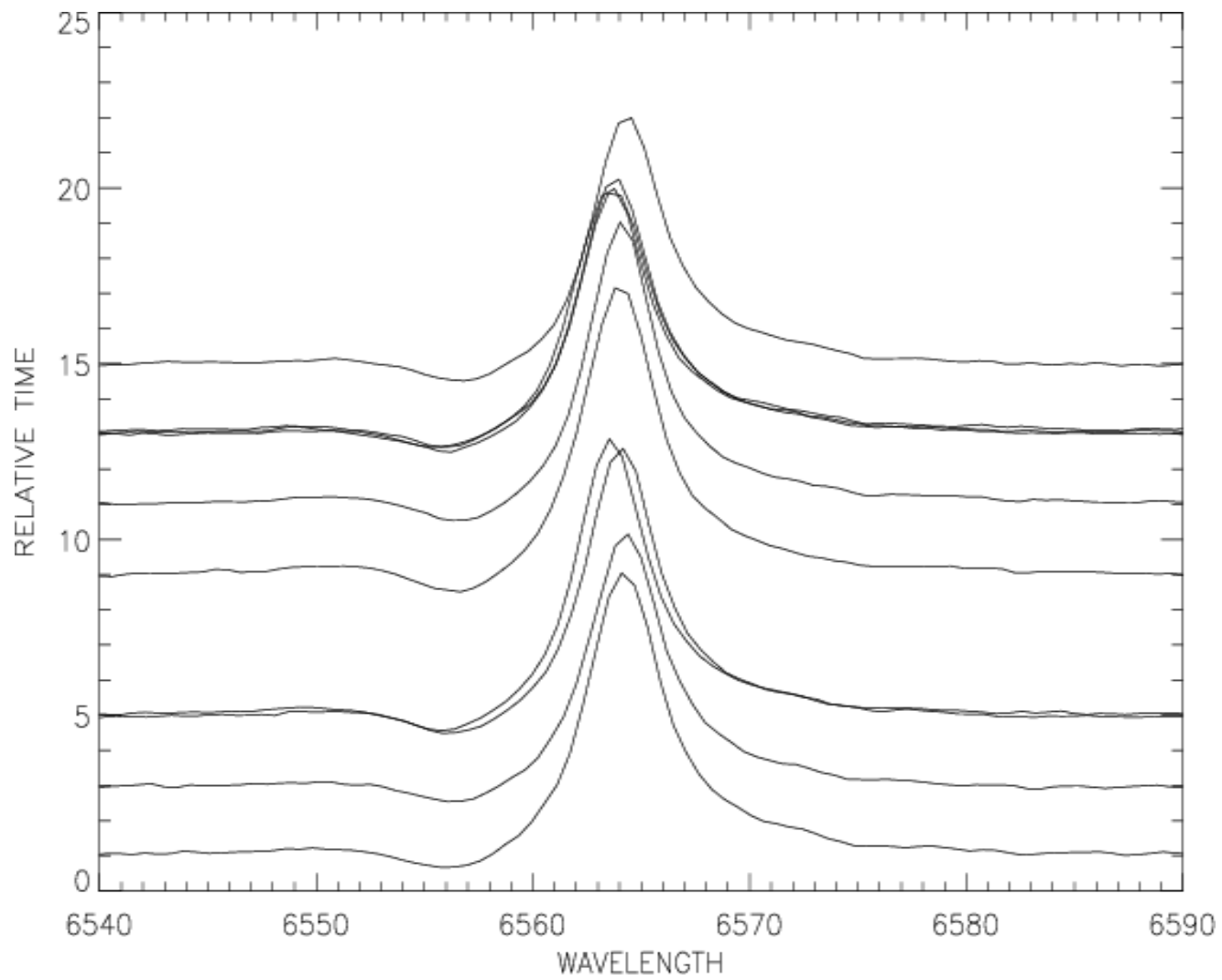
Advantages

- SPSS offers a user friendliness that most packages are only now catching up to. It is popular, and though that is certainly not a reason for choosing a statistical package, many data sets are easily loaded into it and other programs can easily import SPSS files.

Disadvantages

- For academic use SPSS lags notably behind SAS, R and even perhaps others that are on the more mathematical rather than statistical side for modern data analysis.

- Its menu offerings are typically the most basic of an analysis and sometimes lacking even then, and it makes doing an inappropriate analysis very easy.

- It is expensive, sometimes ridiculously so, and even when you do buy you're really only leasing, and its license is definitely not user friendly.

- There are often compatibility issues with prior

Thank You. . .

Thank You   . . .