



# Writing the Results and Analysis

Scientific Research  
Methods and Ethics

# THESIS Chapter

Introduction

Review of Literature

Methodology

Results and Discussions

Summary and Conclusion

# About

- This is a chapter of thesis that present the findings and outcomes of research and reasons for that particular results in form of text, figures graphics and charts.

Results

Discussion

# Writing the Results, Discussion and Analysis sections of the Methodology

How did I solve the problem?

Materials and Methods

What did I find out?

Results

What does it mean?

Discussion

- <http://courses.csusm.edu/psyc393cr/Results.doc> (on using SPSS and Anova)

# Results

- Tells about outcomes/findings of the research study.
- presents the data and findings, ordered/analyzed in ways justified earlier (methodology)
- past tense is a feature here (usually)
- describes the findings in a simple way with the help of data .
- Figures and tables appear here.

# Discussion

- What does the result or data from the experiment mean to us is described in discussion.
- Function of discussion is to :
  - Interpret results in light of what was already known about the subject and
  - Explain new understanding of the problem after taking results into consideration.
- Explain how the results answer the question under study.



# Results & Discussions

## Results

- Core of the research/ research paper.
- Data generated by doing research, after validation and verification is written.
- Results are important in answering the objectives.
- Findings of the research.

## Discussion

- Stating cause for particular results.
- Discuss the meaning of the results.
- Stating clearly what their significance is.
- Compare the results with theoretical expectations .

# Results

- The page length of this section is set by the amount and types of data to be reported. Continue to be concise, using figures and tables, if appropriate, to present results most effectively. See recommendations for content, below.



# General Intent

- The purpose of a results section is to present and illustrate your findings. Make this section a completely objective report of the results, and save all interpretation for the discussion.

# Writing the Results Section

- **IMPORTANT:** You must clearly distinguish material that would normally be included in a research article from any raw data or other appendix material that would not be published. In fact, such material should not be submitted at all unless requested by the instructor.

# Content

- Summarize your findings in text and illustrate them, if appropriate, with figures and tables.
- In text, describe each of your results, pointing the reader to observations that are most relevant.
- Provide a context, such as by describing the question that was addressed by making a particular observation.
- Describe results of control experiments and include observations that are not presented in a formal figure or table, if appropriate.
- Analyze your data, then prepare the analyzed (converted) data in the form of a figure (graph), table, or in text form.

# What to Avoid

- Do not discuss or interpret your results, report background information, or attempt to explain anything.
- Never include raw data or intermediate calculations in a research paper.
- Do not present the same data more than once.
- Text should complement any figures or tables, not repeat the same information.
- Please do not confuse figures with tables - there is a difference.

# Style

- As always, use past tense when you refer to your results, and put everything in a logical order.
- In text, refer to each figure as "figure 1," "figure 2," etc. ; number your tables as well (see the reference text for details)
- Place figures and tables, properly numbered, in order at the end of the report (clearly distinguish them from any other material such as raw data, standard curves, etc.)
- If you prefer, you may place your figures and tables appropriately within the text of your results section.

# Figures and Tables

- Either place figures and tables within the text of the result, or include them in the back of the report (following Literature Cited) - do one or the other
- If you place figures and tables at the end of the report, make sure they are clearly distinguished from any attached appendix materials, such as raw data
- Regardless of placement, each figure must be numbered consecutively and complete with caption (caption goes under the figure)
- Regardless of placement, each table must be titled, numbered consecutively and complete with heading (title with description goes above the table)
- Each figure and table must be sufficiently complete that it could stand on its own, separate from text



# Discussion

- Now you can interpret the theoretical and pedagogical implications of your results. Here you can tackle the tricky questions and unresolved issues highlighted by your results.

# General Intent

- The objective here is to provide an interpretation of your results and support for all of your conclusions, using evidence from your experiment and generally accepted knowledge, if appropriate. The significance of findings should be clearly described.

# Writing the Discussion Section

- Interpret your data in the discussion *in appropriate depth*. This means that when you explain a phenomenon you must describe mechanisms that may account for the observation. If your results differ from your expectations, explain why that may have happened. If your results agree, then describe the theory that the evidence supported. It is never appropriate to simply state that the data agreed with expectations, and let it drop at that.

- Decide if each hypothesis is supported, rejected, or if you cannot make a decision with confidence. Do not simply dismiss a study or part of a study as "inconclusive."
- Research papers are not accepted if the work is incomplete. Draw what conclusions you can based upon the results that you have, and treat the study as a finished work
- You may suggest future directions, such as how the experiment might be modified to accomplish another objective.
- Explain all of your observations as much as possible, *focusing on mechanisms.*

- Decide if the experimental design adequately addressed the hypothesis, and whether or not it was properly controlled.
- Try to offer alternative explanations if reasonable alternatives exist.
- One experiment will not answer an overall question, so keeping the big picture in mind, where do you go next? The best studies open up new avenues of research. What questions remain?
- Recommendations for specific papers will provide additional suggestions.

# Style

- When you refer to information, distinguish data generated by your own studies from published information or from information obtained from other students (verb tense is an important tool for accomplishing that purpose).
- Refer to work done by specific individuals (including yourself) in past tense.



# Style

- Refer to generally accepted facts and principles in present tense. For example, "Doofus, in a 1989 survey, *found* that anemia in basset hounds *was correlated* with advanced age. Anemia *is* a condition in which there *is* insufficient hemoglobin in the blood."

- The biggest mistake that students make in discussions is to present a superficial interpretation that more or less re-states the results. It is necessary to suggest *why* results came out as they did, focusing on the mechanisms behind the observations.

# Presentation of Data

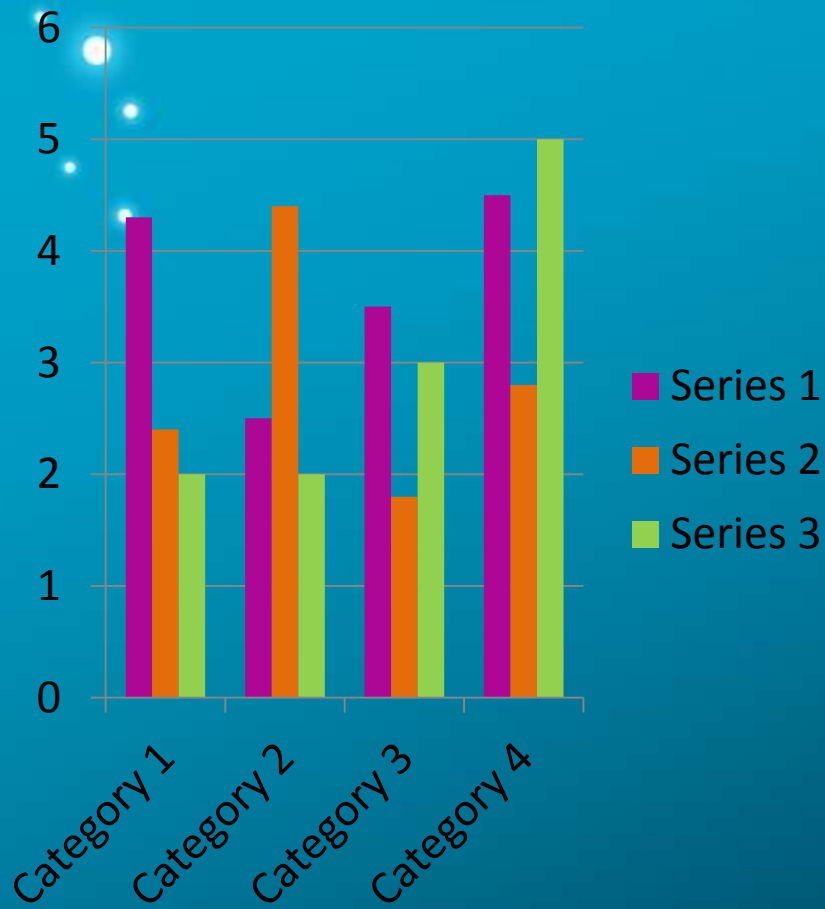
- Tables and figures (photographs, drawings, graphs and flow diagrams) are often used to present details whereas the narrative section of result tends to be used to present the general findings.
- Numerical data can usually be presented more effectively in tables or graphs than in the text.
- The order of presentation of the result should be either chronological to correspond with the methods or from the most to the least important

# Table

- A table is an organized set of data elements (values) using a model of vertical columns (which are identified by their name) and horizontal rows.
- The cell is the unit of table where a row and column intersect.

[illegible]

# Chart



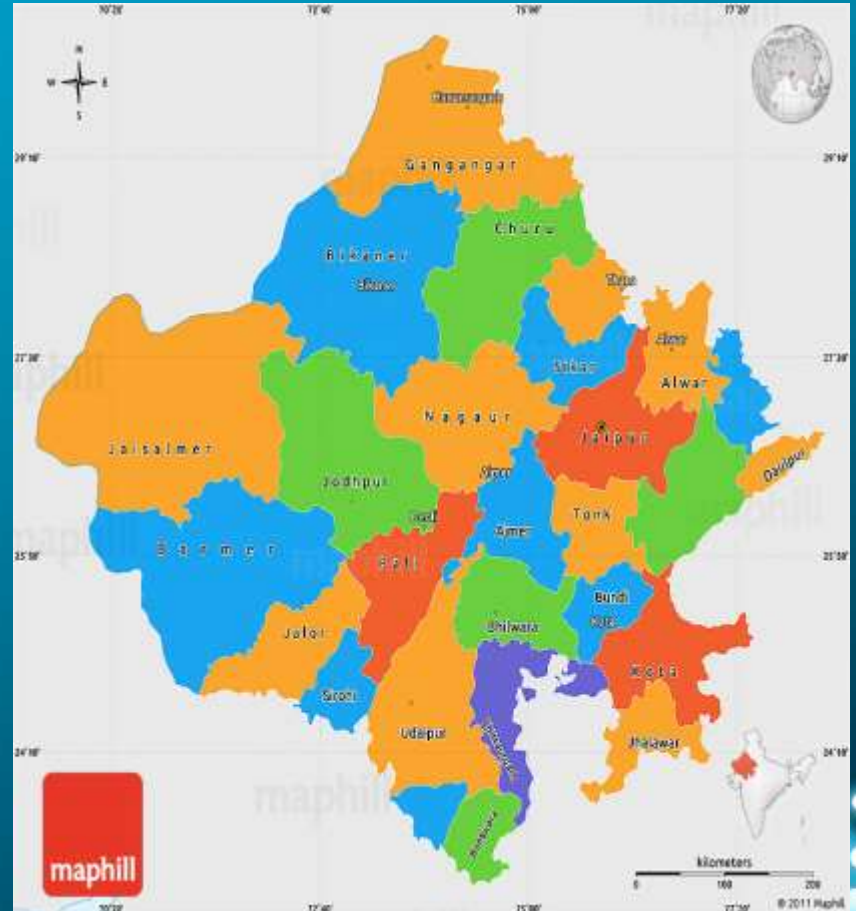
- A chart is a graphical representation of data, in which "the data is represented by symbols, such as bars in a bar chart, lines in a line chart, or slices in a pie chart".
- A chart represent tabular numeric data.

# Graphics

- Graphics are visual images or design used for pictorial representation of data.

## Examples:

- Photographs
- Drawings
- Graphs
- Diagrams
- Symbols
- Maps





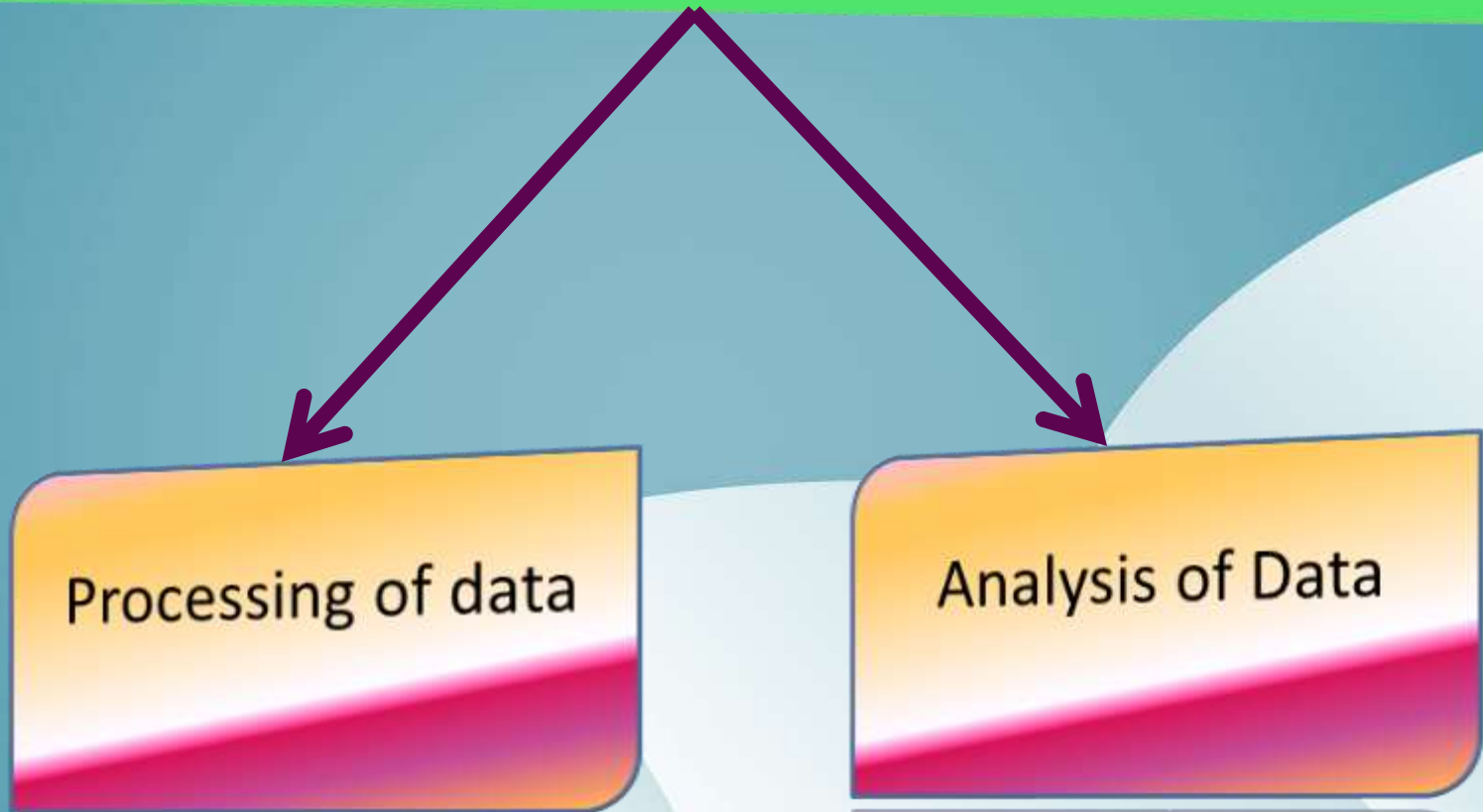
# Purpose of the Results and Discussion Sections

They answer these questions:

- What's the answer?
- What are the implications of your answer?

These two questions are the object of the results and discussion sections, respectively.

# Preparing Results and Discussion



# Processing operation

Editing

- Examination of collected raw data to detect error and omission & to correct these when possible

Coding

- Process of assigning numerals or other symbols so that response can be put into a limited class

Classification

- Convergence of raw data into homogenous group in order to get meaningful relationship.

Tabulation

- Arranging of classified data into a concise and logical order i.e. in form of statistical table

# Statistical measures for Analysis

## Measures of Central Tendency

1. Mean
2. Mode
3. Median

## Measures of Dispersion

1. Standard Deviation
2. Variance

## Measures of Relationship

1. Co relation
2. Regration analysis
3. T test & Z test

# Point to be considered

- Divide chapter into sections according to the objectives.
- Choose one best way instead of presenting same data in several ways.
- Do not present tables and figures in text form.
- Tables and figures should be clearly labeled in order of being referred in the text.

Example: Table 4.2, Figure 4.1 etc.

- Each table should be given a name.
- Table caption are always placed above the table while figure captions are placed below.

# References

- <http://web.mit.edu/course/21/21.guide/th-form.htm>
- <http://www.monash.edu.au/education/docs/booklet-writing-a-thesis-in-education.pdf>
- [http://www.awc.metu.edu.tr/handouts/Thesis\\_Writing.pdf](http://www.awc.metu.edu.tr/handouts/Thesis_Writing.pdf)
- Pasupuleti, M., Scientific Writing Made Easy
- Kothari, C.R., 2008, Research Methodology

# Resources

- <http://www.ruf.rice.edu/~bioslabs/tools/report/reportform.html>
- <http://www.jalt.org/pansig/2007/HTML/HOK.htm>  
Using tables
- <http://www.jalt.org/pansig/2004/HTML/KimKon.htm>, qualitative
- <http://www.rcjournal.com/contents/10.04/10.04.1229>.  
HOW TO WRITE THE METHODS SECTION  
OF A RESEARCH PAPER