

Peer Review Workshop

Organization and Presentation of Data

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RESULTS SECTION

- What did they FIND?

Telling the Story

	Section of the Paper
Step in the Story line	All experiments designed in advance
Question	Introduction /Background
Experiments Done	Methods (Study Design)
Results Found	Results
Answer	Discussion

RESULTS

- **Function:**
 - Objectively present the key results, ***without*** discussing them
 - Presentation must be in an orderly and logical sequence, using both illustrative materials (Tables and Figures) and text.
 - Summaries of the statistical analyses may appear either in the text (usually parenthetically) or in the relevant Tables or Figures (in the legend or as footnotes to the Table or Figure).
 - ***The text of the Results section should highlight the answers to the questions/hypotheses you investigated.***
 - ***Important negative results should be reported, too.***

RESULTS

- **Style:**
 - Text of the Results section to be written concisely and objectively. May use the passive voice but do could also use the active voice when necessary.
 - Usually reported in the **past tense**.
 - Should avoid repetitive paragraph structures.
 - Remember – no discussion of the data in this section.

Results vs Data

- Results are different from data
- Data
 - facts (numbers obtained from the experiments)
 - Raw
 - Summarized
 - Transformed

Results vs Data

- Results
 - General statements that give the meaning of the data
- Data can rarely stand alone; the result must be stated

Results vs Data

Example

- In the 20 control subjects the mean resting systolic blood pressure was 95 ± 5 (SD) mmHg. In comparison, in the 30 tennis players, the mean resting blood pressure was 84 ± 3 mmHg

Results vs Data

Questions

- Are the data similar?
- Different?
- What is the point?
- Purpose of the results section is to make the **POINT CLEAR.**
- State the results first and then present the data

- *The mean resting systolic blood pressure was higher in the 20 control subjects than in the 30 tennis players [95 ± 5 (SD) vs. 84 ± 3 (SD) mmHg, p<0.02].*

Results

- **The body of the Results section is a text-based presentation of the key findings which includes references to each of the Tables and Figures.**
 - The text should guide the reader through your results stressing the key results which provide the answers to the question(s) investigated.
 - A major function of the text is to provide clarifying information. You must refer to each Table and/or Figure individually and in sequence and clearly indicate for the reader the key results that each conveys.
 - Key results depend on your questions, they might include obvious trends, important differences, similarities, correlations, maximums, minimums, etc.

Results

- Things to consider as we review the Results section:
- What are the "results"?:
 - Key results
- **Suppose the study wanted an answer to the following, "Is the average height of male students the same as female students in a pool of first year university students at the University of Ghana?"**
- Data on height would have been collected from large random samples of male and female students at the University of Ghana.
- Then investigators would have calculated the descriptive statistics for those samples (mean, SD, n, range, etc) and plot these numbers.
- If statistical tests are not employed, they would visually inspect these plots. Suppose they found that male first year university students are, on average, 12.5 cm taller than female majors; then this is the answer to the question.
 - Notice that the outcome of a statistical analysis is not a key result, but rather an analytical *tool* that helps the reader to understand *what* the **key result** of the enquiry is.

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Results

- No interpretation of data
- Compare the following two examples:
 - **The duration of exposure to running water had a pronounced effect on cumulative seed germination percentages (Fig. 2). Seeds exposed to the 2-day treatment had the highest cumulative germination (84%), 1.25 times that of the 12-h or 5-day groups and 4 times that of controls.**
 - The results of the germination experiment (Fig. 2) suggest that the optimal time for running-water treatment is 2 days. This group showed the highest cumulative germination (84%), with longer (5 d) or shorter (12 h) exposures producing smaller gains in germination when compared to the control group.

Results

Finally;

- Look out for whole sentences devoted to reporting a statistical outcome alone.
- Two notes about the use of the word *significant(ly)*.
 - In scientific studies, the use of this word implies that a statistical test was employed to make a decision about the data; in this case the test indicated a larger difference in mean heights than you would expect to get by chance alone.
 - Preferable to limit the use of the word "significant" to this purpose only.
 - If the parenthetical statistical information includes a p-value that is significant, ($p < 0.05$), it is unnecessary (and redundant) to use the word "significant" in the body of the sentence.

Results

- Description of the results should follow directly from the tables and figures
- Should summarise what is shown in the tables with appropriate reference to them
- Comment on all data shown in each table
- Point estimates to be presented with confidence intervals (or P-values - though most journals prefer CI's)

TABLES

- Table:
 - Set of data arranged in rows and columns.
- Purpose:
 - To present a large quantity of information clearly and concisely.
 - Typically display numerical data in columns and rows for easy classification and comparison.
 - Tables do not duplicate text, but rather present new information.
 - They should be interpretable without the text. (If taken out of its original context, it should still convey all the information necessary for the understanding of the data)

Tables – Basic guidelines

- Clear and concise title, describing the what, where and when of the data
- Rows and columns should be clearly labeled, to include units of measurements
- Row and column totals should be shown (where appropriate); Percents should have their totals (check to see if it adds up to 100%)
- Any codes or abbreviations used must be fully explained in a footnote
- Exclusions should be explained in a footnote (*e.g. 1 case and 2 controls with unknown family history were excluded from this analysis*)
- If data are not original, the source of the data must be given in a footnote

Tables

- Numbering
 - Tables should be numbered in order as they are discussed in the text; Table 1, Table 2, Table 3 etc.
- Title
 - Unique title for each table, Brief and yet descriptive of what the table contains
- Style
 - Lines should be use only where necessary
 - May use horizontal lines
 - Different types of information to be located in different columns
 - Column headings should refer to information below and not next to the heading
 - A heading covering multiple columns (spanners) must have a row above or beneath that heading containing individual column headings

TABLES

- The tables and figures should be such that the paper can be largely “read” based on these alone
- Should be as simple as possible,
 - Should not have unnecessary data
 - two simple tables better than in one complicated table
- Not too many decimal points (must be appropriate to the analysis being presented and also consistent with other values in the text)
 - e.g. odds ratio = 4.7 not 4.735
 - related to size of confidence interval - not 1.23 (95%CL: 0.13, 9.68) better 1.2 (95%CL: 0.1, 9.7)

Tables - checklist

- Is the table necessary?
- Is it referred to in the text?
- Are all comparable tables in the manuscript consistent in presentation (do they follow the instructions of the journal)
- Is the title brief and explanatory?
- Does every column have a heading?
- Are all abbreviations, codes etc. explained?

FIGURES

- Instructions from the journal
- Legends usually separate from the figures
- All axes must be labelled and units given in figure or legend
- Should be as simple as possible, but if too simple, question if necessary
- Ask why a point is better made with a figure than a table – one or the other to be used not both.
- Maps and similar diagrams
 - Should give key to all symbols used
 - Should show scale (not $1\text{ cm} = 1\text{ km}$, as journal may shrink figure)
 - Should show North on maps
- Use of colour dependent on journal's policy.

Results

- **Some things to look out for:**
 - **Values** reiterated in a Figure and Table - only the *key result* or *trends* that each conveys.
 - **Data presented** in both a Table and Figure - considered redundant and a waste of space and energy.
 - **Look out for reports of raw data values** when summary information may be more appropriate.

Results: Summary

- Brief and uncluttered
- No discussion of the data
- Do not repeat data in text and tables/figures
- Most important results first

Results Summary

- Are the results clearly explained?
- Does the order of presentation of the results parallel the order of presentation of the methods?
- Are the results reasonable and expected, or are they unexpected?
- Are there results that are introduced that are not preceded by an appropriate discussion in the Methods section?

Tables - Summary

- Do they appropriately describe the results?
- Should one or more tables be added?
- Should some of the tables be combined or done away with?

Figures and Graphs - Summary

- Are the figures and graphs appropriate and are they appropriately labelled?
- Would a different figure better illustrate the findings?
- Do the figures and graphs adequately show the important results?
- Do arrows need to be added to depict important or subtle findings?
- Do the figure legends provide a clear explanation that allows the figures and graphs to be understood without referring to the remainder of the manuscript?

Thank You