Araştırma Yöntemleri ve Bilimsel Etik

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Outline

- How-to cite ?
- How-to prepare tables ?
- How-to prepare graphics ?

How-to cite

- You should list only significant, published references.
  - References to unpublished data, abstracts, theses, and other secondary materials should not clutter up the References or Literature Cited section.
  - If such a reference seems absolutely essential, you may add it parenthetically or as a footnote in the text.
  - A paper that has been accepted for publication can be listed in Literature Cited, citing the name of the journal followed by "*In press*."
- And don't forget, as a final check, *make sure that all references cited in the text are indeed listed in the Literature Cited and that all references listed under Literature Cited are indeed cited somewhere in the text*.

How-to cite

- Do NOT use slipshod methods in citing the literature.
  - A common way is the "handwaving reference," in which the reader is glibly referred to **"Smith's elegant contribution"** without any hint of what Smith reported or how Smith's results relate to the present author's results. If a reference is worth citing, the reader should be told why
- Do NOT insult the authors of previous studies.
  - It is probably all right to say "Smith (1997) did not study. . . ."
  - ***But it is not all right to say*** "Smith (1997) totally overlooked. . . ." or "Smith (1997) ignored. . . ."
- Be careful if you are putting all citations at the end of sentences
  - We have examined a digital method of spread-spectrum modulation for multiple-access satellite communication and for digital mobile radiotelephony.[1][2]
  - We have examined a digital method of spread-spectrum modulation for use with Smith's development of multiple-access communication[1] and with Brown's technique of digital mobile radiotelephony.[2]

How-to prepare tables ?

- As a rule, do not construct a table unless repetitive data *must* be presented. There are two reasons for this general rule.
- First, it is simply not good science to regurgitate reams of data just because you have them in your laboratory notebooks; only samples and breakpoints need be given.
- Second, the cost of publishing tables is very high compared with that of text, and all of us involved with the generation and publication of scientific literature should worry about the cost.

How-to prepare tables ?

- The data presented in the table can be presented in the text itself in a form that is readily comprehensible to the reader, while at the same time avoiding the substantial additional
- Very simply, these results would read: "Aeration of the growth medium was essential for the growth of *Streptomyces coelicolor.* At room temperature (24°C), no growth was evident in stationary (unaerated) cultures, whereas substantial growth (OD, 78 Klett units) occurred in shaken cultures."

Table 1. Effect of aeration on growth of *Streptomyces coelicolor*

Temp (°C)	No. of expt	Aeration of growth medium	Growth[a]
24	5	+[b]	78
24	5	–	0

[a] As determined by optical density (Klett units).

[b] Symbols: +, 500-ml Erlenmeyer flasks were aerated by having a graduate student blow into the bottles for 15 min out of each hour; –, identical test conditions, except that the aeration was provided by an elderly professor.

How-to prepare tables ?

Table 3. Oxygen requirements of various species of *Streptomyces*

Organism	Growth under aerobic conditions[a]	Growth under anaerobic conditions
Streptomyces griseus	+	–
S. coelicolor	+	–
S. nocolor	–	+
S. everycolor	+	–
S. greenicus	–	+
S. rainbowenski	+	–

[a] See Table 1 for explanation of symbols. In this experiment, the cultures were aerated by a shaking machine (New Brunswick Shaking Co., Scientific, NJ).

- All this table tells us is that "*S. griseus, S. coelicolor, S. everycolor,* and *S. rainbowenski* grew under aerobic conditions, whereas *S. nocolor* and *S. greenicus* required anaerobic conditions."

How-to prepare tables ?

- All numerical data must be put in a table !?
- Table 4 is an example.
  - It gets sadder when we learn (at the end of the footnote) that the results were not statistically significant anyway (*P* = 0.21).
- If these data were worth publishing, one sentence in the Results would have done the job:
- "The difference between the failure rates — 14% (5 of 35) for nocillin and 26% (9 of 34) for potassium penicillin V — was not significant (*P* = 0.21)."

Table 4. Bacteriological failure rates

Nocillin	K Penicillin
5/35 (14)a	9/34 (26)

[a] Results expressed as number of failures/total, which is then converted to a percentage (within parentheses). P = 0.21.

How-to prepare tables ?

- Another very common but often useless table is the word list.
  - Table 5 is a typical example. This information could easily be presented in the text.
- A good copyeditor will kill this kind of table and incorporate the data into the text.
- **The rule:** Present the data in the text, or in a table, or in a figure. ***Never*** present the same data in more than one way

Table 5. Adverse effects of nicklecillin in 24 adult patients

No. of patients	Side effect
14	Diarrhea
5	Eosinophilia (³5 eos/mm3)
2	Metallic tastea
1	Yeast vaginitisb
1	Mild rise in urea nitrogen
1	Hematuria (8–10 rbc/hpf)

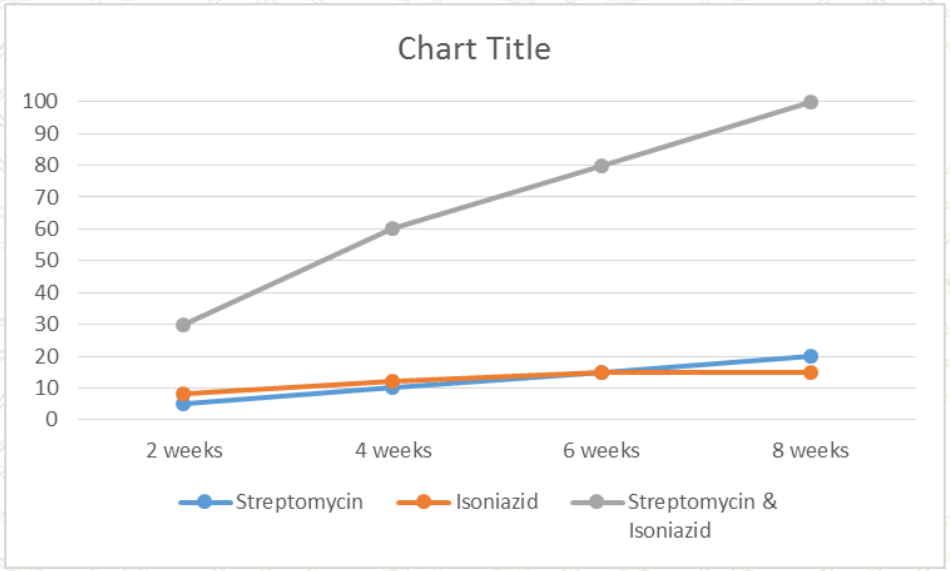
[a] Both of the patients who tasted metallic worked in a zinc mine.

Tables vs. Figures

Treatment[b]	Percentage of negative cultures at:			
	2 weeks	4 weeks	6 weeks	8 weeks
Streptomycin	5	10	15	20
Isoniazid	8	12	15	15
Streptomycin + Isoniazid	30	60	80	100

[a]The patient population, now somewhat less so, was described in a preceding paper (61)

[b]Highest quality available from our supplier (Town Pharmacy, Podunk, IA).



How-to Prepare Graphics ?

"Effective information design focuses on what the graphic is supposed to convey in terms of its data content. It includes the typography used for the graphic display, the weight of lines, and the visual arrangement of the data."

- Which formats to use...
- Selecting type of the graphic
- Graphic properties
- Measurement intervals

Graphic Formats

- EPS
  - An EPS file is a PostScript (.PS) file. It may contain 2D vector graphics, bitmap images, and text and include an embedded preview image in bitmap format. EPS files can also be placed within another PostScript document.
- TIFF
  - TIFF (Tag Image File Format) is a common format for exchanging raster graphics (bitmap) images between application programs, including those used for scanner images
- JPG/PNG
  - Portable Network Graphics (PNG) is a raster graphics file format that supports lossless data compression. PNG was created as an improved, non-patented replacement for Graphics Interchange Format (GIF), and is the most widely used lossless image compression format on the Internet.

Selecting Type of The Graphic

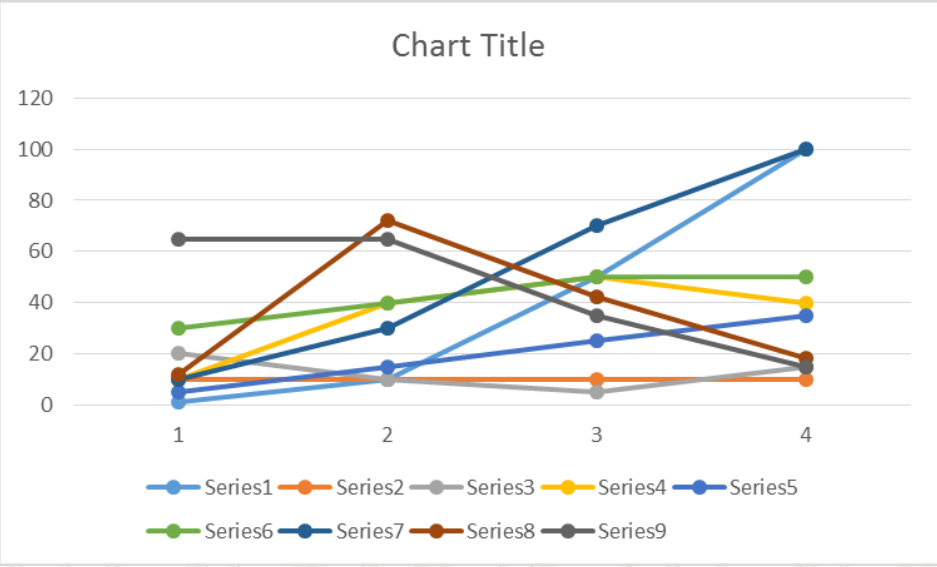
Graphic Properties

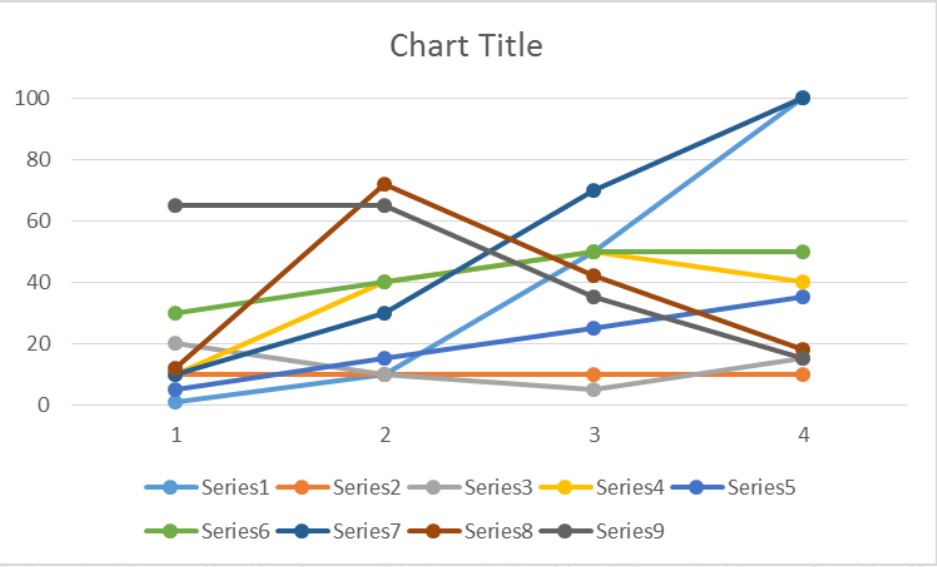
- Position & Size
  - *do NOT forget that you are limited by the width of a column or a page*
  - *do try to place figures as close as to related text*
- Line types
  - If you have just one curve, use open circles for the reference points; use open triangles for the second, open squares for the third, closed circles for the fourth, and so on. *If you need more symbols, you probably have too many curves for one graph, and you should consider dividing it into two.*
- Line size
  - *be sure that your lines are visible, when printed*

Graphic Properties

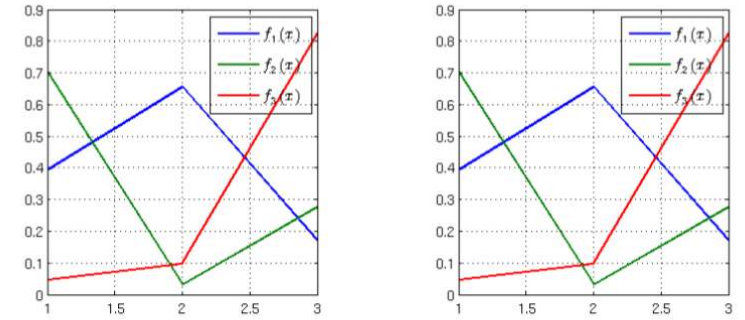
- Axis properties
  - **Do not extend** the ordinate or the abscissa beyond what the graph demands.
    - For example, if your data points range between 0 and 78, your topmost index number should be 80.
    - You might feel a tendency to extend the graph to 100; this urge is especially difficult to resist if the data points are percentages, for which the natural range is 0 to 100.
  - **You must resist this urge**, however.
    - If you do not, parts of your graph will be empty; worse, the live part of your graph will then be restricted in dimension,
    - because you have wasted perhaps 20% or more of the width (or height) with empty white space.

Examples of Bad Graphics





Combining Graphics



(a) Figure-1 (b) Figure-2

(c) Figure-3 (d) Figure-4

Figure 1: This is main figure caption

Now you can refer to subfigures as follows Fig. 1(a), Fig. 1(b), Fig. 1(c) and Fig. 1(d).

- Whenever figures are related and can be combined into a composite, they should be combined.
- The composite arrangement saves space and thus reduces printing expense.
- More important, the reader gets a much better picture by seeing the related elements in juxtaposition
- Since **width** is the important element from the printer's point of view, *it is often advisable to combine figures "over and under" rather than "side by side."*