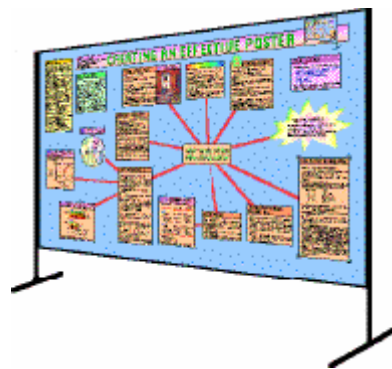


CREATE AN EFFECTIVE POSTER

Will G. Hopkins ©1997



[This document was created originally as a multi-panel poster. The text under each heading and the figures were on separate panels, as illustrated in this figure.]

ABSTRACT

Elements of an effective poster include:

- **Concise content.** Make it similar to a brief communication. Combine Results and Discussion. An itemized Conclusion is helpful. Cite few, if any, references.
- **Plain language.** Make sentences short. Avoid jargon and abbreviations. Be informal: use *I, we, you*, not the passive voice.
- **Clear graphics.** Clarify the study design with a diagram. Use a graphic suitable for your data. Split a complex graphic into simpler ones. Give informative titles. Label axes horizontally and show units. Label multiple lines, bars, and pie-chart segments directly, rather than via a legend. Use LARGE plotting symbols. Show error bars. Avoid the “depth” effect.
- **Few tables.** Use tables for descriptive statistics of your subjects and for sets of correlation coefficients. Otherwise, graphics are usually better.
- **Relevant numbers.** Use two significant digits for correlations, percentages, relative risks, effect sizes; one or two for standard deviations; and one for P values. Omit test statistics (t , F , χ^2). Show errors as SDs, *never* as SEMs.
- **Big plain fonts.** Main text 25-30 pt; detail 20-25 pt; headings 40-200 pt. Use *italic* or **bold** for emphasis. Avoid fancy fonts and underline.
- **Lots of Color.** If text is black on white, use colored pens, prints, or card to enhance graphics, titles, or panel mounts. Color printing is superior, but use dark text against pale backgrounds
- **Visual impact.** Be creative with shape, size, decoration, and placement of the panels. Add icons or prints to focus attention.
- **Efficient mounting.** Use PowerPoint or similar drawing program to make one or more panels. Laminated paper and Velcro dots are better than card and pins. Group related panels, or link with colored tape on the board.

BACKGROUND

Got some good results? Make them even better by presenting them well. If you're giving a poster, cool! Posters can be better than slides. The atmosphere is more relaxed. The author can talk one-to-one with interested people. And as a viewer you can skip posters on uninteresting topics, but you have to sit through a boring talk.

Here's my advice on how to make your poster effective. Most of it is obvious, but some is new and may surprise you.

Note: all data shown in this poster are fictitious.

CONCISE CONTENT

- Make your poster similar to a brief communication, with Abstract, Introduction, Methods and so on.
 - It depends on the topic, though. For example, this poster needed a different approach.
- Explain why you did the work in the first sentence or two of the Introduction. And make it seem interesting, even if it's not!
- Don't put too much information in your poster. Some details can be left for face-to-face discussion.
- A hint of humor doesn't hurt.
- Try combining Results and Discussion sections.
 - I have found that a combined Results and Discussion section is easier to write and read. It's a pity more journals don't allow this approach.
- An itemized Conclusion is helpful.
- Cite few, if any, references.

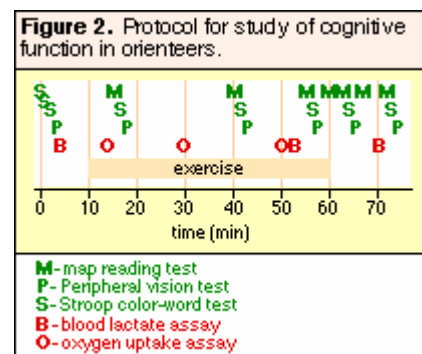


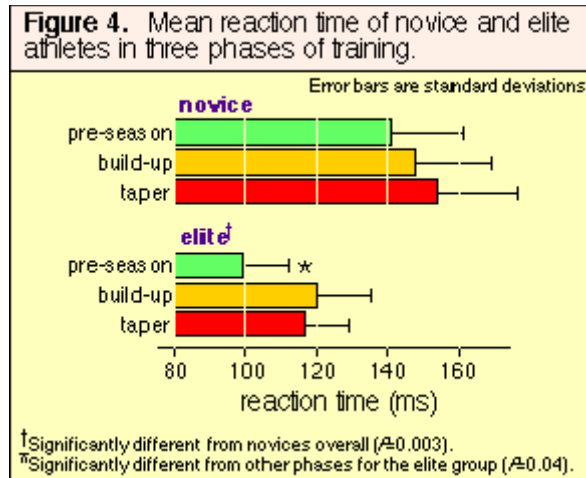
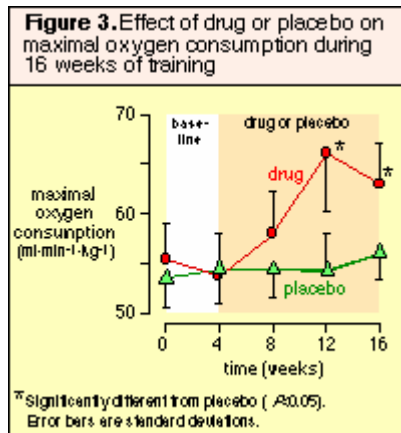
PLAIN LANGUAGE

- Make sentences short: some people can't read even simple instructions (see Figure 1).
- Avoid jargon and abbreviations.
- You should aim for a wide audience, so avoid technical terms known only to experts. Obscure abbreviations also interrupt the flow.
- Be colloquial rather than formal: use *I*, *we*, *you*, not the passive voice.
- But you still have to get spelling and grammar right. Check out the guidelines on style at the Sportscience site (<http://www.sportsci.org/journal/jour9701/style/style.htm>).

CLEAR GRAPHICS

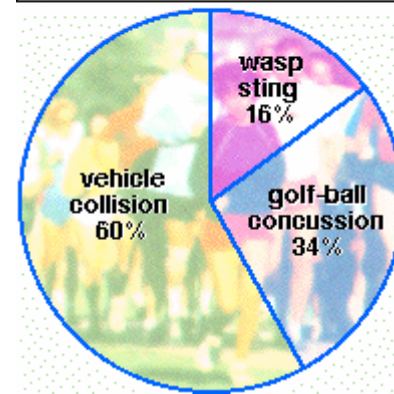
- Clarify the design of a complex study with a diagram (e.g. Figure 2).
- Use the most appropriate kind of graphic for the data: a line diagram or scattergram when both variables are numeric; a bar graph when only one is numeric; a pie chart for proportions in different groups (Figures 3-5).





- A bar graph is often better than a pie chart for proportions.
- Two simple graphics may be better than a complex one.
- Give each graphic an informative title.
- Label the axes with horizontal lettering, and always show units (cm, s, %, etc.). Why horizontal lettering, even for the Y axis?

Figure 5. Causes of accidental death during recreational jogging.



See if you can guess!

- Label multiple lines, bars, and pie-chart segments directly rather than via a legend.
- Make sure different plot symbols are LARGE enough to be distinguished.
- Error bars are essential, but don't clutter the figure with too many.
- Avoid the "depth" effect.
 - Depth is the 3-D effect that graphing packages can give to 2-D data. Good journals don't use it, because it's distracting.

FEW TABLES

- Use a table for descriptive statistics of your subjects and for sets of correlation coefficients. Otherwise, graphics are usually better.
- Some simple results can be stated in the text rather than in a table or graphic.
- Follow the style shown in Table 1. Partition with horizontal lines, but avoid vertical lines.

Table 1. Characteristics of athletes in the rural and urban samples.

	females	males
<i>rural^a</i>		
age (y)	22.1 ± 4.2	25.6 ± 4.8
height (cm)	172 ± 8	179 ± 9
weight (kg)	66 ± 7	71 ± 8
<i>urban^b</i>		
age (y)	19.2 ± 4.1*	21.6 ± 3.6*
height (cm)	171 ± 8	178 ± 9
weight (kg)	65 ± 6	70 ± 8

Data are mean ± SD.
^a16 females and 21 males.
^b88 females and 123 males.
 *Significantly different from mean of rural sample ($P = 0.007, 0.04$).

RELEVANT NUMBERS

- Use two decimal places for correlations. Use two significant digits for percent-ages, relative risks, and effect sizes; one or two for standard deviations; and one for P values.
 - These rules apply to full publications, too.
 - Too many significant digits clutter the data and show you up as statistically naive.
 - Here are some correct examples:

mean \pm SD	others
178 \pm 13	73%, 2.1%
2350 \pm 270	r = 0.92, 0.03
72 \pm 8	RR = 2.5, 0.84
8.7 \pm 3.1	ES = 0.41, 1.4
0.034 \pm 0.007	P = 0.007, 0.04, 0.3

- Omit test statistics (t , F , χ^2).
 - This rule also applies to full publications. If you have included a P value or a confidence interval, the test statistic is redundant.
- Show “error” as a standard deviation (SD), never as a standard error of the mean (SEM).
 - SDs show the spread of numbers.
 - SDs convey the size of the difference between means of groups.
 - SEMs are absolutely wrong for repeated measures.
 - People use SEMs because, being smaller, they look better!

BIG PLAIN FONTS

- Most text should be in 25-30 pt. Detail should be in 20-25 pt.
 - Big fonts are easy to read.
 - With big fonts you’ll have to be brief, because you won’t have room to write too much.
- Headings should be in 40-200 pt.
 - The main title of this poster was in 170 pt Chicago; the headings of each panel were in 48 pt Helvetica/Arial.
 - Fonts like these, without serifs, seem to look better for headings.
- Use *italic* or **bold** for emphasis.
- Avoid fancy fonts and underline.
 - Fancy fonts are OK for a *relevant* effect in a heading or graphic, but otherwise they are hard to read.
 - Underline belongs in the era of typewriters or the Web!

LOTS OF COLOR

- If text is black on white, use colored pens, prints, or card to enhance graphics, titles and panel mounts.
- For best results, scan colored prints into a computer and edit them with a graphics package.
- Color printing is superior to black and white, but use dark-colored text against pale backgrounds.

- Ink-jet printers are as good as laser printers for posters. Use printers with two cartridges (black plus color) to get the best dark colors and black.

VISUAL IMPACT

- Be creative with shape, decoration, and placement of the panels. See below for examples from the original poster about posters.
- Add icons or images to focus attention. But make sure they are relevant.

EFFICIENT MOUNTING

- Create with Microsoft PowerPoint or a drawing program.
 - Download and try the accompanying PowerPoint templates.
 - Use one PowerPoint 4 document for all panels in landscape orientation, and another document for portrait orientation.
 - The maximum size of panels in PowerPoint is 54" x 54". For larger panels use CorelDraw, ClarisDraw, Adobe PageMaker, or similar.
- Print as one or two large panels or as 5-20 smaller panels.
 - Smaller panels (1-2x letter or A4 size) are easier to make, update/correct, and transport.
 - Larger panels with integrated artwork can look more professional.
- Card+pins is the traditional method for mounting, but laminated paper panels with Velcro dots are easier to make, transport, and mount. Use matt or semi-gloss lamination, not glossy.
- Overlap or tape panels together at the venue as necessary. Get there early if you have a lot to do.
- Group related panels together, or link them with colored duct tape stuck onto the display board.

CONCLUSIONS

- Main features of an effective poster:
 - plain language and concise content;
 - clear graphics and tables;
 - not too many numbers;
 - big fonts;
 - lots of color.
 - Creating an effective poster takes time, but it's fun.
 - Like everything else, give it your best shot.
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