Clinical reports at ALZA are written using WordPerfect and graphic data presentations are created with SAS/GRAPH software and imported into the WordPerfect document. The critical issues for the importing of SAS/GRAPH output pertain to the size of the figure (graph) in WordPerfect and the size of characters in the figure. Since both SAS/GRAPH software and WordPerfect can control size of a graph, and SAS/GRAPH software can control the size of characters within the graph, it may not be clear in which environment to exercise this control. However, a basic understanding of how SAS/GRAPH software determines character size and the use of GOPTIONS parameters to modify some of the default device driver parameters provides a basis for establishing some ground rules for creating SAS/GRAPH output. The device driver specified by WordPerfect is HP7475A. This paper was written using WordPerfect 5.1. All of the examples presented use the same SAS/GRAPH output and use the box option in WordPerfect. The figure also contains a boxed letter A to show the size and shape of one cell. In the following examples the first line of the title was reduced by setting height=1.

Since WordPerfect can control the size of figures (Graphics/Figure/Edit/Size), why not bring the SAS/GRAPH output into WordPerfect and adjust the size? First, the characters may not be the appropriate size relative to the size of the figure. Figure 1 was created in SAS/GRAPH software with an intended size of 14x12 cm, but sized to 7x6 cm in WordPerfect. The characters in the figure are too small. Second, while the figure can be scaled up or down, changing the ratio of the horizontal to vertical only adds blank space around the graph within the figure box. In figure 2 the size was set to 14x20 cm in WordPerfect resulting in extra space above and below the figure.

Also, figures can be edited in WordPerfect (Graphics/Figure/Edit/Edit) and the X and Y scale percent changed. The result of this is to change the aspect ratio of the characters, normally yielding undesirable results. Figure 3 was scaled to 50% X and 100% Y resulting in characters which are elongated vertically, and extra space on either side of the figure.

The size of a cell in SAS/GRAPH software is the default character size. While the character size can be controlled in SAS statements (eg, height=2), another approach is to control the cell size, thereby controlling all characters and symbols in the graph. Of course, if certain characters need to be larger or smaller, eg, graph titles, this is easy to accomplish with the appropriate parameters. The objective is, however, to set up the cell size environment so that the resulting WordPerfect graph will have readable character sizes using the default hardware font in SAS/GRAPH software.

Cell size is determined by the combination of the four parameters VSIZE, HSIZE, VPOS and HPOS. The vertical size of the cell is VSIZE/VPOS. For the HP7475A device driver LROWS=40 and YMAX=18 cm (7.087 in), yielding a vertical cell size of 0.45 cm; LCOLS=100 and XMAX=25 cm (9.843 in), yielding a horizontal cell size of 0.25 cm. The aspect ratio is 0.5555 (0.25/0.45). One limitation imposed by the cell size is the number of spaces available for printing in a line. As HPOS is decreased fewer characters and fit horizontally, and as VPOS is decreased fewer characters can fit vertically.

The suggested technique is to set VSIZE and HSIZE to the maximum possible according to the ratio of the desired height to width (default is 18 cm/25 cm=0.72), then adjust the values of VPOS and HPOS. First determine the desired size of the graph in WordPerfect, and calculate the ratio (R) of height/width. If this ratio is less than 0.72 then set HSIZE=25 cm and VSIZE=R*HSIZE; if the ratio is greater than 0.72 then set VSIZE=18 cm and HSIZE=VSIZE/R. To restore the default cell size (0.25x0.45 cm) multiply desired figure width (cm) by 4 (100/25) to get HPOS, and to get VPOS multiply the desired figure height (cm) by 2.22 (40/18). Using VPOS, HPOS, VSIZE and HSIZE according to these algorithms will produce characters and symbols with the appropriate aspect ratio (ratio of horizontal to vertical size). After the graph has been imported into WordPerfect, both the horizontal and vertical sizes should be set according to the desired size.

Figure 4 was created using HSIZE=20.9 cm, VSIZE=18 cm, HPOS=56 and VPOS=27 for an intended size of 14x12 cm. Using the technique suggested above, R=12/14=0.86, HSIZE=18/0.86=20.9 cm, HPOS=4*14=56 and VPOS=2.22*12=27.
Mean (SE) Assay (mg)
Type 1 v Type 2

Condition:
○ Type 1
□ Type 2

Figure 2
When a graph is intended to be relatively small in WordPerfect, setting the SAS/GRAPH parameters according to this technique may result in errors in running the SAS program. If the figure is small, HPOS and VPOS will be correspondingly small so that the cell size is large. With small values of HPOS and VPOS, SAS/GRAPH software may not be able to fit the graph components. For example, using an intended size of 12x10 cm (R=.83) and setting HSIZE=21.7 cm, VSIZE=18 cm, HPOS=48 and VPOS=22, the following error message was obtained:

ERROR: The specified y-origin for the axis labeled TIME did not leave enough space for the text. The origin was at 20 and the text required 18.181818572 percent above the footnotes and legend. The graph was not produced.

When the cell size is reduced by doubling HPOS and VPOS and doubling the height of characters and symbols, no SAS/GRAPH error message occurs.

Summary

The technique described above produces predictable and readable results when SAS/GRAPH output is imported into WordPerfect. By setting the GOPTIONS parameters HSIZE, VSIZE, HPOS and VPOS, readable characters and graph symbols are produced without requiring height parameters for titles, labels, symbols etc. This provides a predictable starting point from which further figure adjustments may be made with SAS/GRAPH software or WordPerfect.
Appendix

SAS code used to produce the figures in this presentation:

* Figure in WordPerfect 14x12 cm (R=.86);
%let MHPOS=55;
%let MVPOS=27;
gopa...s reset=all device=hp7475a gsmode=replace gfname=gsp nosprompt nodisplay;
gphsize VSIZE=20.9 cm HSIZE=18 cm MHPOS=VPO MVPOS=
filename gsp 'g:sugi17\plot.gsp';
proc datasets memtype=cat lib=work; delete 95e9; quit;
tttiet f=none h=1 'Mean (SE) Assay (mg)';
tttlet2 'Type 1 v Type 2';
data AN1;
  length text $22 function style $8;
  retain x y;
  xsys='3'; ysys='3';
  function='label'; x=x+2; y=75; position='6'; text='Condition'; output;
  function='symbol'; x=x+2; y=75; position='6'; text='Type 1'; output;
  function='symbol'; x=x+2; y=75; position='6'; text='Type 2'; output;
  draw one cell;
  xsys='6';
ysys='6';
xs = int(&MHPOS*0.80);
y = int(&MVPOS*0.95);
x = xs; y = ys; function = 'move'; output;
x = x+1; y = y+1; function = 'bar'; line = 0; output;
x = x+5; y = y+5; function = 'label'; text = 'A'; position = '5'; output;
x = x+6; function = 'label'; text = 'One cell'; position = '5'; output;
run;
symbol1; symbol2;
symbol1 c=black i=join v=CIRCLE;
symbol2 c=black i=join v=SQUARE;
proc gplot data=SUG17 anno=AN1;
axis1 length=75 pct origin=(17,20) pct
order=0 to 12 by 2 minor=(n=1)
offset=(1,1) pct label=\{c r=0 a=90 'Months'\};
axis2 length=60 pct origin=(17,20) pct
order=60 to 100 by 10 minor=(n=1)
offset=(0,0) pct label=\{c r=0 a=90 'Mean (mg)'\};
plot AV_MNIC*TIME=LTYPE /vaxis=axis2 haxis=axis1 nolegend name='GR1';
run;
symbol1; symbol2;
symbol1 c=black i=hilot;
symbol2 c=black i=hilot;
proc gplot data=NCH10;
plot AV_MNIC*TIME=LTYPE /vaxis=axis2 haxis=axis1 nolegend name='GR2';
run;
goptions display;
proc gplayplay not=1;
igout gseg;
tc temp;
tdef whole 1/default;
template whole;
treplay 1:'GR1 1:'GR2';
quit;
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