Using the VBAR and HBAR Statements and the TEMPLATE Facility to Create Side-by-Side, Horizontal Bar Charts with Shared Vertical Axes Labels

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ABSTRACT

PROC GREPLAY's TEMPLATE facility provides the user with the means to create graphic images that are not available as part of any of the standard SAS/GRAPH® procedures. This paper demonstrates a method for creating side-by-side horizontal bar charts with common, central vertical axes labels. This was accomplished by creating one graph with VBAR, one with HBAR, and replaying them through a template. One of the template panels was then rotated relative to the other so that the vertical axes were parallel in the center of the display with the horizontal axes extending in opposite directions. Making the graphs symmetrical was accomplished by setting HSIZE, VSIZE, HPOS and VPOS so that the graphical display area and cells were square, and providing identical WIDTH and SPACE options and AXIS statements for each graph. The graphs were then aligned with each other by creating square panels in the template. The vertical axes labels were created with GSLIDE and placed on the graph with template panels.

INTRODUCTION

The World Health Organization's Coordinating Center for Biostatistics in Diabetes, located in the Department of Biostatistics and Epidemiology at the University of Oklahoma Health Sciences Center, is responsible for analyzing the data from a multi-center follow-up study designed to assess the role of diabetes in the occurrence of vascular disease. The baseline study, begun in 1974, included data collected at 14 centers in 13 countries. Ten of the original 14 centers participated in the follow-up phase of the study. The published papers of the baseline study (Jarrett, Keen, & Grabauskas, 1979; Keen & Jarrett, 1979) utilized a graphical presentation of the data that displayed results, by study center and gender, in side-by-side, horizontal bar charts (one for each gender) that extended spatially in opposite directions with common labels (indicating study center) centered between the two parallel ordinate axes (i.e., 'population tree charts'). We wished to use this same method to display the results of the follow-up study.

The ability to create population tree charts is not readily available in any of the existing SAS/GRAPH procedures (e.g., PROC GCHART). The SAS/GRAPH User's Guide provides examples of population tree charts created using Annotate macros in an ANNOTATE= data set. This method is quite complicated, requiring considerable programming. Additionally, we needed to generate a large number of these graphs (reflecting the outcome of the many variables measured), many of them with subdivided bars. Ideally, we needed a 'prototype' program that produced a population tree chart that required only minor editing in order to produce a chart for each new variable. The TEMPLATE facility in PROC GREPLAY enables the SAS/GRAPH user to create graphic images that are not available as part of any of the standard SAS/GRAPH procedures by allowing for the positioning of multiple graphs in a single graphical display area. Utilizing the TEMPLATE facility we were able to use existing SAS/GRAPH procedures (PROC GCHART and PROC GSLIDE) to create a prototype population tree chart image that required editing of only the variable names in PROC GCHART statements (e.g., HBAR, VBAR) in order to generate an identical graphic image for each different variable.

This paper discusses the use of the TEMPLATE facility of PROC GREPLAY to create a population tree chart using graphic images generated with PROC GCHART and PROC GSLIDE. This application was developed in an MS-DOS operating environment. Some familiarity with SAS/GRAPH, PROC GREPLAY and the TEMPLATE facility are assumed.

METHOD

One of the problems encountered when using the TEMPLATE facility for displaying multiple graphic output is that of distortion of one or more of the images when replayed through a template panel. This is due to the attributes of the SAS/GRAPH graphic page. A discussion of the basic attributes of the SAS/GRAPH graphic page, the problems of image distortion and some methods for its correction have been presented previously (Mitch, 1990). Eliminating distortion and achieving symmetry was of particular concern in the development of this application since two separate graphs, one of them rotated, were to be displayed as a single graphic image. This required that the two graphs be aligned exactly, that their bars be of the same width, and their axes of the same length and increment. This was accomplished by...
setting the GOPTIONS so that the display area of each graph was square and about the same size as the template panel through which it would be replayed, and by making the cells of the display area square. The following is an explanation of the SAS® code (see Appendix 1) used for producing the prototype population tree chart image.

1. Using GSLIDE create one graph for each label to be placed between the two graphs. Make each one about the same size as the panel that it will occupy. This is accomplished by setting HSIZE and VSIZE in a GOPTIONS statement.

2. Reset HSIZE and VSIZE so that the graphics display area is square and about the same size as the TEMPLATE panels that you intend to play the graphs through. Set HPOS and VPOS to the same value so that the cells in the graphics display area will be square.

3. Use AXIS statements to make the axes in the two graphs identical in terms of length, labels, increments (i.e., ORDER=), etc. Use the SPACE and WIDTH options in the VBAR and HBAR statements to make the size and position of the bars on the axes identical.

4. Reset HSIZE and VSIZE to the size of your final output display area (e.g., 8" x 10") and invoke GREPLAY to create a template.

5. Define panels for the two bar charts that are square and about the same size as the HSIZE and VSIZE used to create the charts. Rotate one of the panels so that the two charts extend in spatial opposition to each other from the center. In this example the HBAR graph is rotated -90 degrees (panel 2 definition). Once the panel has been rotated it may be necessary to correct the x,y coordinates slightly in order for the two panels to be perfectly aligned in the display area. For instance, the coordinates defined for panel 2 prior to rotation were L-Left X=22, U-Left X=22, U-Right X=78, L-Left Y=2, U-Left Y=47, U-Right Y=47, L-Right Y=2. Once the panel was rotated the coordinates were slightly off in relation to panel 1 (e.g., L-Left X=21.9, U-Left X=78.1, etc.). Just edit them to correspond with the panel 1 coordinates. Alternatively, one may simply define the coordinates initially from the rotated perspective, which has the same effect.

6. Define panels for the labels between the two larger panels that will contain the bar charts.

7. Replay the graphs through the panels in the template in order to create a new graphic image.

**SUMMARY**

Combining several graphic images into a single image can be a challenging task when using the TEMPLATE facility of PROC GREPLAY. In this application, a population tree chart was created from two graphic images, one generated with VBAR and one with HBAR. Symmetry and alignment were achieved by setting HSIZE and VSIZE so that the display area of each of the original graphic images was square and about the same size as the templates through which they were to be replayed, and by setting VPOS and HPOS so that the cells within each display area were square.

I would like to thank Susan Kenny for her comments and suggestions during the development of this application.

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**REFERENCES**


Appendix 1: SAS code for population tree chart

LIBNAME A 'A:\';
GOPTIONS NODISPLAY NOPROMPT HSIZE=.24 VSIZE=4.25 PTEXT=SWISSXBM ASPECT=1 VPOS=9 HPOS=4 DEVICE=LQ800;
PROC GSLIDE DES='LON' GOUT=A.MSVDD;
FOOTNOTE A=-90 J=L H=.3 IN 'LON';
RUN;
PROC GSLIDE DES='SWI' GOUT=A.MSVDD;
FOOTNOTE A=-90 J=L H=.3 IN 'SWI';
RUN;
PROC GSLIDE DES='WAR' GOUT=A.MSVDD;
FOOTNOTE A=-90 J=L H=.3 IN 'WAR';
RUN;
PROC GSLIDE DES='BER' GOUT=A.MSVDD;
FOOTNOTE A=-90 J=L H=.3 IN 'BER';
RUN;
PROC GSLIDE DES='ZAG' GOUT=A.MSVDD;
FOOTNOTE A=-90 J=L H=.3 IN 'ZAG';
RUN;
PROC GSLIDE DES='HON' GOUT=A.MSVDD;
FOOTNOTE A=-90 J=L H=.3 IN 'HON';
RUN;
PROC GSLIDE DES='TOK' GOUT=A.MSVDD;
FOOTNOTE A=-90 J=L H=.3 IN 'TOK';
RUN;
PROC GSLIDE DES='HAV' GOUT=A.MSVDD;
FOOTNOTE A=-90 J=L H=.3 IN 'HAV';
RUN;
PROC GSLIDE DES='OKL' GOUT=A.MSVDD;
FOOTNOTE A=-90 J=L H=.3 IN 'OKL';
RUN;
PROC GSLIDE DES='ARI' GOUT=A.MSVDD;
FOOTNOTE A=-90 J=L H=.3 IN 'ARI';
RUN;
GOPTIONS HSIZE=8.0 VSIZE=10.0 DISPLAY;
PROC GREPLAY IGOUT=A.MSVDD GOUT=A.MSVDD TC=A,PLATES TEMPLATE=FREQ;
RUN;

GOPTIONS HSIZE=5 VSIZE=5 VPOS=80 HPOS=80;
PATTERN V=X3;
PROC GCHART GOUT=A.MSVDD DATA=A.FA;
   WHERE H1S=1;
   AXIS2 LABEL=(A=-90 J=C H=2 'MALES') VALUE=(H=1.5 A=-90) ORDER=(0 TO 220 BY 20) LENGTH=4.5 IN;
   VBAR H03 / DISCRETE WIDTH=4 SPACE=2 AXIS=AXIS2 MAXIS=AXIS1;
RUN;
PROC GCHART GOUT=A.MSVDD DATA=A.FA;
   WHERE H1S=2;
   AXIS2 LABEL=(H=2 'FEMALES') VALUE=(H=1.5) ORDER=(0 TO 220 BY 20) LENGTH=4.5 IN;
   HBAR H03 / DISCRETE NOSTATS WIDTH=4 SPACE=2 AXIS=AXIS2 MAXIS=AXIS1;
RUN;

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**PROC GREPLAY**
**REPLAY: DIRECTORY A.PLATES (E)**

**PROC GREPLAY: TEMPLATE DESIGN**

**COMMAND #**

**TEMPLATE: FREQ**

**DESC: SIDE BY SIDE HORIZONTAL GRAPHS**

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**FIGURE 1. TEMPLATE DEFINITION PANEL**

**FIGURE 2. TEMPLATE PANELS**
**Figure 3. Graphics Catalog**

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**Figure 4. Population Tree Chart**

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