

# Changing Titles on Graphs With Minimal Processing

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## Intro

Have you ever created numerous graphs only to have someone make a "minor" change in the title such as changing "Appendix 12.1" to "Appendix 12.2"? While it only takes seconds to change "1" to "2", it may take a considerable time to run the job. This is especially true in the pharmaceutical industry where there can be hundreds of graphs generated from one small program. This paper will show you a two-step process to reduce the processing time. The first step is to create and store your graphs without the title. The second step is to create the title and print the graphs. Each time the title is changed you just repeat the second step. You only need to repeat the first step if some part of the graph itself or the data changes. This method can also be used to put multiple graphs on a page and have one "main" title over all the graphs.

## Goptions

When you create your graphs, you must have the GOUTMODE option set to APPEND or you will erase your graphs from the catalog when you run the next graph. It doesn't matter if it is the same program or a different program. REPLACE is needed when you send you graphs to some printers or graphic stream files.

Other options will depend upon you system and the graphs you are creating. Some sites will set defaults for you which are different that the Institute-supplied defaults. You'll probably need different options for creating/storing the graphs and printing them.

## STEP 1 - Create the graph

Create the graph as you normally would except for the first title. If there is only going to be one graph on a page, I put in a blank title:

```
TITLE1 F=DUPLICATION H=3 ;
```

This will leave space for the first title. Be sure to use the same font and height as you will in the real title so the spacing is correct. If you don't

use the blank title line, you will need to modify Step 2 as shown below.

Graphs will be stored in a catalog. You'll need to verify how to create a catalog on your operating system and version. Some systems will automatically create the catalog for you. You can store data and graphs in the same place but some sites require separate files. After the catalog is created, use a LIBNAME statement to reference it.

```
LIBNAME GRAPHS 'MYID.GRAPHS.CATALOG' ;
```

When you create the graph, you will use the GOUT option to save it. For example:

```
PROC GPLOT DATA=ONE GOUT=GRAPHS.STUDYA;  
  PLOT RESULT*WEEK=GROUP /  
      NAME='RESWK' ;
```

The graph will be stored in catalog STUDYA in the location indicated by the LIBREF GRAPHS. Within STUDYA, the specific graph name is RESWK.

## STEP 2 - Create titles and print graphs

(This paper assumes the printing part will be a batch job.)

Create the title and store it in the same catalog as the graphs from Step 1.

```
PROC GSLIDE GOUT=GRAPHS.STUDYA  
  NAME=TITLE1;  
  TITLE F=DUPLICATION H=3 'Appendix 1.7' ;  
  RUN;
```

To combine the graphs and print them:

```
PROC GREPLAY IGOUT=GRAPHS.STUDYA;  
  TC=TEMP;  
  TDEF ONEBOX  
  1/      LLX=0    LLY=0  
        ULX=0    ULY=100  
        URX=100  URY=100  
        LRX=100  LRY=0;  
  TEMPLATE ONEBOX;  
  TREPLAY 1:TITLE1 1:RESWK;
```

The original graph and the newly created title will be overlaid using a template.

The PROC GREPLAY creates the template and combines the graphs. TC=TEMP refers to a template catalog name TEMP. Since it is a one-level name, it only exists for this program. You can also create permanent template catalogs by using a two-level name such as GRAPHS.TEMP. The TDEF statement defines the template. I've named the template ONEBOX. For each panel, specify the coordinates at the corners with 0,0 representing the lower-left-hand corner and 100,100 representing the upper-right-hand corner. Be careful when you specify the coordinates or you can create some very distorted graphs. The TEMPLATE statement identifies which one to use for the graphs. The TREPLAY statement indicates to "replay" the graphs using a template. Place graph TITLE1 in Panel 1 and place graph RESWK in Panel 1 of the template. SAS® doesn't care that both graphs are in the same panel.

When you need to change the Appendix number, you will just need to change the PROC GSLIDE and run Step 2 with the GSLIDE and REPLAY PROCs. There is no need to run Step 1 again.

When a graph with a specified name already exists, SAS gives the new graph a different name. To avoid this, use the following before you create your new title.

```
PROC GREPLAY IGOUT=GRAPHS.STUDYA NOFS;
  DELETE TITLE1;
```

You can include this as part of your first run and SAS will give you a message indicating the graph does not exist.

### Storing Templates

If you store your template permanently with a two-level name in TC= when you define it, you don't need to repeat the definition. You can use:

```
PROC GREPLAY IGOUT=GRAPHS.STUDYA;
  TC=GRAPHS.TEMP;
  TEMPLATE ONEBOX;
  TREPLAY 1:TITLE1 1:RESWK;
```

Some people prefer to always define the template within the program so you can confirm the template coordinates that were actually used.

If you store templates in a catalog, be sure you have strict guidelines on who can edit existing templates or you might find some unusual graphs appearing in the next run. Templates do not need to be stored in the same catalog as the graphs but all graphs you are displaying must be in the same catalog.

### Modify Step 2 for Title Space

If you don't reserve a blank space for the title, you'll need to modify the template by creating two panels. The panel for the graph will need to be a little smaller than the title panel.

```
PROC GREPLAY IGOUT=GRAPHS.STUDYA;
  TC=TEMP;
  TDEF BOXTITLE
  1/      LLX=0      LLY=0
          ULX=0      ULY=100
          URX=100    URY=100
          LRX=100    LRY=0
  2/      LLX=0      LLY=0
          ULX=0      ULY=90
          URX=100    URY=90
          LRX=100    LRY=0;
  TEMPLATE BOXTITLE;
  TREPLAY 1:TITLE1 2:RESWK;
```

I've simply moved the top of the graph down. You may also want to adjust the sides to keep the height/width in the same proportions if your graph is sensitive to distortion. The amount for the adjustment will depend on the size of the title. The most common mistake in this example is to create a small box for the title instead of keeping it full-size. Even though you only see one title line, SAS sees one line with text and blank space below it. The blank space has to fit into the template panel as well.

### Multiple graphs on a page

The next part of the paper will show how to put several graphs on the same page with one title. It is similar to the situation where you didn't save room for the title.

I created a graph for each of four groups in my data instead of one line for each group. Notice I only specified one name. SAS will name the graphs RESWKA, RESWKA1, RESWKA2, and RESWKA3 so each graph has a unique name. If you had specified an 8-character name, SAS would have replaced the last character with the

number. If you have more than nine graphs, it replaces the last two characters.

```
PROC GPLOT DATA=ONE GOUT=GRAPHS.STUDYA;  
  BY GROUP;  
  PLOT RESULT*WEEK / NAME='RESWKA';
```

The GREPLAY to put all four graphs on the same page follows.

```
PROC GREPLAY GOUT=TEMP TC=TEMP NOFS;  
  TDEF BOX4  
  DES='4 BOXES WITH TITLE SPACE'  
  1 /    LLX=0    LLY=50  
        ULX=0    ULY=90  
        URX=50   URY=90  
        LRX=50   LRY=50  
  2 /    LLX=50   LLY=50  
        ULX=50   ULY=90  
        URX=100  URY=90  
        LRX=100  LRY=50  
  3 /    LLX=0    LLY=0  
        ULX=0    ULY=40  
        URX=50   URY=40  
        LRX=50   LRY=0  
  4 /    LLX=50   LLY=0  
        ULX=50   ULY=40  
        URX=100  URY=40  
        LRX=100  LRY=0  
  5 /    LLX=0    LLY=0  
        ULX=0    ULY=100  
        URX=100  URY=100  
        LRX=100  LRY=0;  
  TEMPLATE BOX4;  
  TREPLAY 1:RESWK 2:RESWK1 3:RESWK2  
          4:RESWK3 5:TITLE1;  
RUN;
```

Notice that the overall title panel doesn't have to be Panel 1. When you do several graphs on one page, make sure you leave enough white space between each graph. Sometimes your graphs will have plenty of white space and other times you'll need to put the space between the panels.

I've also moved the TC to an option on the PROC rather than a separate statement. I included a description for the template, too.

I also added the option NOFS which indicates you are not using a full-screen. In a batch job you don't have full screen capabilities anyway so it doesn't matter. Use this option if you are running an interactive job and just want to display the graph without seeing the replay screens.

#### Previewing templates

Sometimes the coordinates aren't easy to figure out. What if you needed 3 graphs with two on top and the third centered on the bottom? Experimenting with coordinates is much easier in interactive SAS.

In interactive SAS, submit

```
PROC GREPLAY;
```

You don't even need a RUN statement. If you just want to experiment with templates, you can leave most of the fields blank. Fill in the TC field. (One-level name for temporary templates to be in WORK.GSEG and two-level name to store them in a catalog. Make sure you have already referenced the catalog with a LIBNAME statement.) Enter TC on the command line.

You are now on a screen with a list of templates in your catalog. If this is your first use of the catalog, you won't have any names. On the command line, enter EDIT *tempname* where *tempname* is the template you want to create.

You now get a screen to enter the coordinates for each panel. There are also several other options you can enter. These options can also be used in a batch job. After you enter the panel numbers and coordinates, enter PREVIEW on the command line to see your results. If you like the results, use the END key to return to the previous screen. Use END again to return to the list of templates and save your results. (If you don't get a message that the results were saved, you should go back to the coordinate screen and type the command SAVE.) You should now have a template listed.

If you didn't like the results, just change the coordinates and PREVIEW the changes until you like your results. Specify a color when you want a box to appear around the panel when you use the template.

To see a graph in the template, return to the first screen. This time you will need to indicate where your graphs are stored by completing the IGOUT field. You'll also need to specify the TC field for the template catalog and the TEMPLATE field for the name of the template. In the SEL field for each graph, put the panel number. If two graphs have the same number, they will overlay each other.

PROC GREPLAY also has many other uses. I created the example graphs and stored them in a catalog for future reference. I used PROC GREPLAY to send them to a graphics stream file which I then downloaded to my PC. I was then able to import them into my word-processor and add comments so the graphs and text would be in one document. We are just starting this process at my current site so you can see I need to change some options to have a better-looking graph. The original SAS graph was in color but I needed to use a black-and-white printer.

#### Data Step Graphics Interface

You can accomplish the same results by using the Data Step Graphics Interface instead of PROC GREPLAY. For more information on how to use DSGI, please contact the author.

#### Conclusion

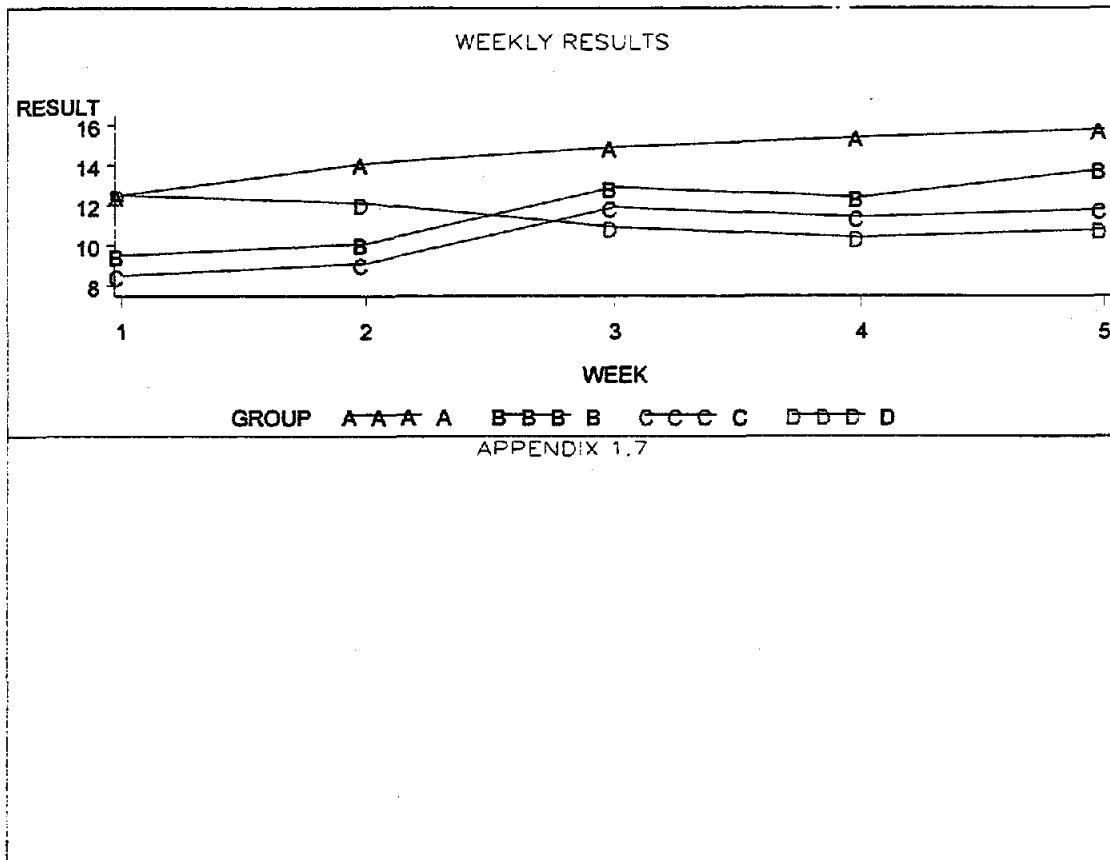
PROC GREPLAY can be a useful tool to reduce processing time in making minor changes.

Note: These graphs were created in color and down-loaded to a word-processor to be printed in black-and-white. The actual graphs are much clearer.

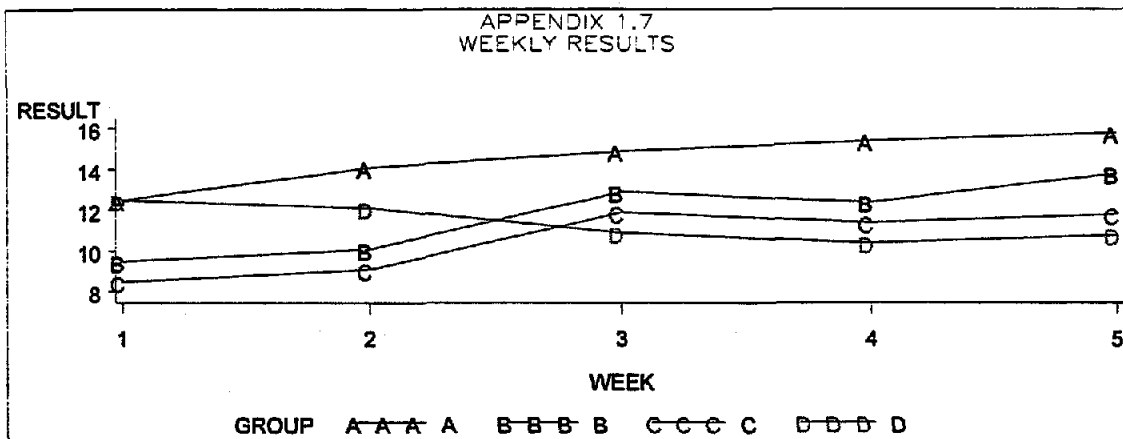
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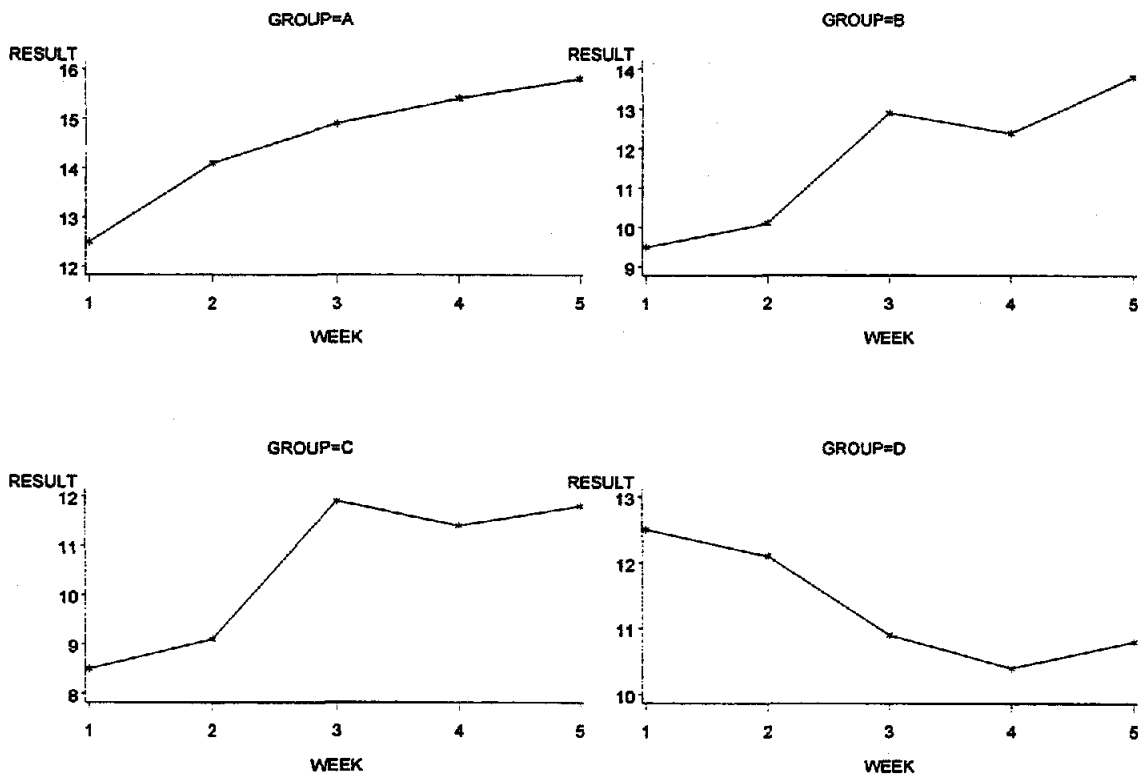


Step 1. Top box shows graph without title. Bottom box shows title only.



Step 2. This is the finished graph with the title overlaid on the graph. You won't have a box around the graph unless you specify a color for the panel.

## APPENDIX 1.7



Multiple graphs per page. The graph for each group is created as a separate graph. All four graphs and the title are then combined and printed with PROC GREPLAY.