

Problem with your SAS® Program? Solutions abound!

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ABSTRACT

All SAS users at some point will come across a SAS problem that they cannot resolve on their own. This paper explains where and how to get help to solve any SAS problem. The appropriate use of such sources of help as SAS Help Facility, SAS-L Newsgroup, SAS.com's Knowledge Base, and many others is demonstrated. Their strengths and limitations are analyzed and compared.

Additionally, most SAS users do not even realize they can contact SAS technical support about almost any SAS problem. This underutilized approach of getting help directly from SAS is also explained.

INTRODUCTION

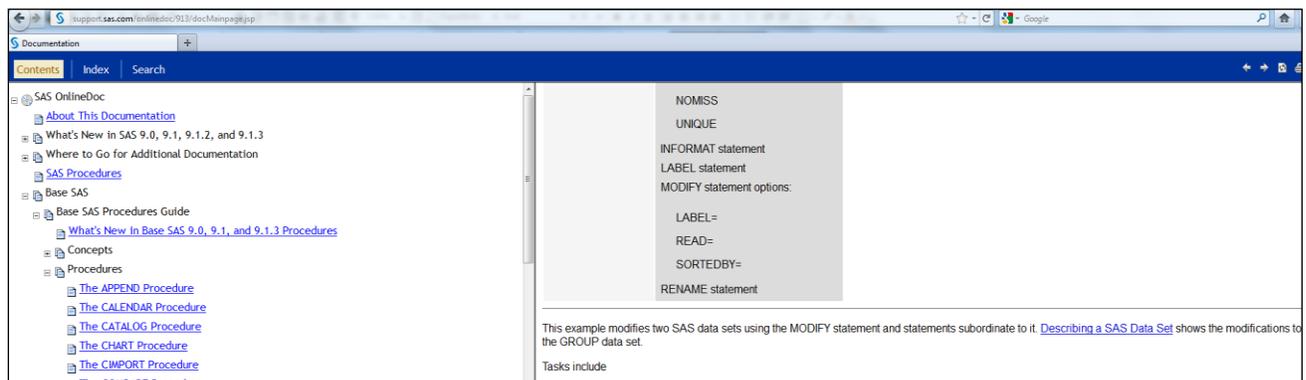
SAS is a very powerful application designed to perform a large variety of tasks. However, with this power comes a certain degree of complexity. Trying to find the solution to a SAS problem can be a very frustrating experience due to the complexity of SAS software. Even a very experienced SAS user can get stuck trying to understand why certain code does work or does not work correctly. Even if a solution is eventually found, finding it may have monopolized time that could have been spent more effectively on other tasks. Fortunately, there are many different ways to find solutions to SAS problems. Some approaches involve looking for information in either SAS documentation or sas.com's Knowledge Base. Other approaches require researching documentation created by expert SAS users at SAS user groups or various SAS user forums. Searching for someone else's existing solution does not imply an incompetence or lack of problem-solving skills. In fact, this is a very efficient and timesaving approach to a problem.

In a case of more difficult problems, besides looking for existing information, it is possible to ask an expert either at the SAS-L newsgroup or directly at SAS technical support. Getting help via SAS-L depends on the willingness of other SAS users to provide an answer, while asking SAS technical support a question guarantees getting the help.

SAS HELP FACILITY

When faced with a problem, usually the first step for SAS users is to consult the software's help facility. SAS offers one of the most comprehensive and easy to use help facility compared with many other programming packages.

The best way to learn something or get help is by looking at example programs. The SAS help facility offers an extensive library of many excellent examples. These example programs demonstrate the use of almost any SAS syntax. SAS programs are located in a specific directory, most have code to create test data sets, and explain the results of the code execution. SAS also provides test data sets in the SASHELP library. The help facility is interactive. Any SAS syntax statement can be searched by its keyword in the SAS help facility. For example, the search results for "PUT" keyword contains all uses of the word PUT in SAS whether it is function or a statement. This approach makes it easy for users to find the correct example. The help facility can be also found on-line at <http://support.sas.com/documentation/onlinedoc/91pdf/index.html>. The on-line help facility can be searched and navigated in the same way as the regular help facility.



Display 1. On-line SAS Help Facility

Various sections of online help can also be downloaded as a PDF file.

CONSULTING A COLLEAGUE

The excellent help facility in SAS is sufficient to provide help for the majority of programming problems. However, there are often situations when it is difficult to find an answer to a problem just by using the help facility. The next step in many cases would probably be consulting a colleague. However, many SAS users may not feel comfortable asking for help for various reasons: their colleagues may be busy or may not have sufficient expertise in the specific area. Some SAS users may be reluctant to ask a question because this may create an impression of lack of knowledge about an issue or poor problem-solving skills. If the ultimate goal is efficiently reconciling a programming obstacle, this option should not be quickly discarded.

SEARCH ENGINES

The next step in finding an answer is most likely to search Internet. Simply by typing the problem in a search engine will quite often bring up the desired answer. Sometimes this approach works faster than even looking for a similar answer in the help facility. For example, let's assume one needs to quickly find example code to read Excel file into SAS. One can certainly look up 'PROC IMPORT' or the 'INPUT' in the SAS help facility and find code to do that. However that approach may require sifting through multiple options and suggestions in Help's search facility. If the goal is to refresh one's memory about the syntax or to find a sample code then using a search engine may suffice. For example, typing "sas read excel" in a search engine would lead to the following top search results.

The screenshot shows search results for the query "sas read excel". The results are categorized by type: Everything, Images, Maps, Videos, News, Shopping, and More. The top result is a link to "SAS FAQ: How do I read/write Excel files in SAS?" from www.ats.ucla.edu, dated Oct 12, 2011. Other results include "Reading Data into SAS" from the same source, "Using SAS® 9.1.3 (and later) to Read and Write to Excel 97, 2000 ..." from support.sas.com, and "119-2007: Reading Excel Workbooks - SAS" from www2.sas.com. There is also a result for "Horsham, PA" with a "Change location" option.

Display 2. Top Google Search Results of "sas read excel file"

An example of such code can be found almost immediately.

The screenshot shows a SAS help page titled "SAS FAQ: How do I read/write Excel files in SAS?". It includes a section "Reading an Excel file into SAS" with a sample data table and SAS code for importing the data. The data table has columns MAKE, MPG, WEIGHT, and PRICE. The SAS code uses PROC IMPORT to read the data from an Excel file named auto.xls.

MAKE	MPG	WEIGHT	PRICE
AMC Concord	22	2930	4099
AMC Pacer	17	3350	4749
AMC Spirit	22	2640	3799
Buick Century	20	3250	4816
Buick Electra	15	4080	7827

```
PROC IMPORT OUT= WORK.auto1 DATAFILE= "C:\auto.xls"
    DIMS=xls REPLACE;
    SHEET="auto1";
    GETNAMES=YES;
RUN;
```

Display 3. Suggestion for how to import Excel into SAS

This approach sometimes allows finding a solution to an easy SAS problem rather quickly. However, searching for a more specific SAS solution on a search engine may be difficult due to multitude of search results.

SAS USER GROUP CONFERENCE PROCEEDINGS

The proceedings of SAS user groups contain thousands of extremely useful presentations covering all aspects of SAS. The best way to search for the proceedings is at <http://lexjansen.com/>, which contains papers from most major SAS user groups.

The screenshot shows the 'SAS Proceedings' website. At the top, it says 'This searches 16336 SAS papers from SAS Global Forum, SUGI, PharmaSUG, NESUG, SESUG, PhUSE, WUSS, MWSUG, PNWSUG and SCSUG.' There is a search bar with 'Google Custom Search' and a 'Search' button. To the right, it says 'Alternatively, search for a word based on [title](#), [author](#) or [keywords](#).' Below this is a disclaimer: 'Lex Jansen is a SAS employee. The views expressed on this website do not represent the views of SAS.' The main content is a grid of boxes, each representing a conference and the number of papers presented there. For example, '8704 SAS papers presented at SGF/SUGI 1976-2011.' and 'SAS Global Forum 2012: April 22-25, Orlando, FL'. Other conferences listed include PharmaSUG, NESUG, PhUSE, MWSUG, SESUG, WUSS, and SCSUG. There are also links to 'Share your knowledge interactively on the PhUSE Wiki' and 'Read the PhUSE Blog'.

Display 4. The Proceedings of SAS User Groups at <http://lexjansen.com>

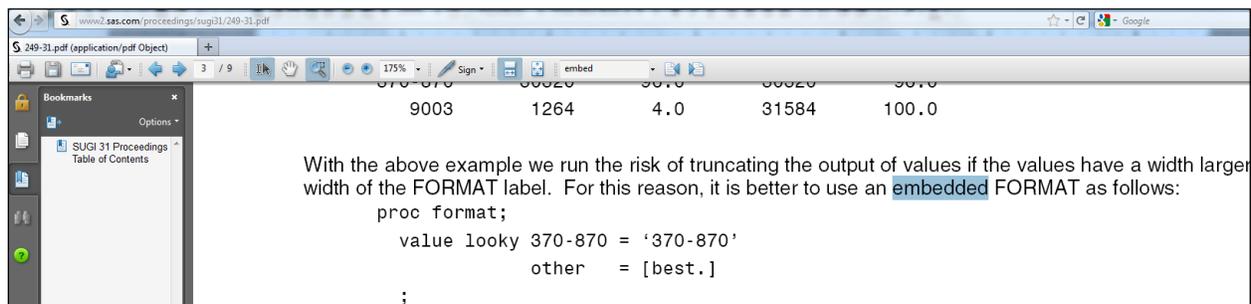
Many SAS solutions can be found at this link. For example, let's look at a problem of embedding one format within another one. The CNTRY5 format is needed to format countries from the list of codes.

```
ARG ="Argentina"  
AUA ="Austria"  
AUS ="Australia"  
BEL ="Belgium"  
BRA ="Brazil"  
BUL ="Bulgaria"
```

The current format is missing Afghanistan. The CNTRY5 format is a standard format that is difficult to modify and the best solution in this case is to add Afghanistan to the CNTRY5 format and create a new format. The author did not know the exact syntax for embedding formats. Searching the SAS help facility did not lead to any relevant results. However, the search of SAS user group's proceedings immediately found several papers with the examples of such code.

The screenshot shows a search result on the SAS Proceedings website. The search query is 'embedded format'. The results are displayed in a list format. The first result is '249-31: The Power of the FORMAT Procedure - SAS'. The text of the result says: 'width of the FORMAT label. For this reason, it is better to use an embedded FORMAT as follows: proc format; value looky 370-870 = '370-870' other = [best] ... www2.sas.com/proceedings/sug31/249-31.pdf'. The second result is '245-31: Using Database Principles to Optimize SAS® Format ...'. The text of the result says: 'DEFINITION DIAGRAM OR EXAMPLE. Embedded Format. Embedded formats contain labels that invoke other formats. There are two distinct embedded format ... www2.sas.com/proceedings/sug31/245-31.pdf'. The third result is 'Using Format Concatenation in SAS Software to Decode Data in ...'. The text of the result says: 'an equation are known as embedded formats. The dated records in the transaction file depicted in Figure 2 can be matched to the appropriate format with the ... www.nesug.org/proceedings/nesug99/iss/083.pdf'. The fourth result is 'Using Style Sheets to Format SAS Output Web Page Layout'. The text of the result says: 'sample style sheets are provided as follows: EMBEDDED STYLE SHEETS. The embedded'.

Display 5. The Proceedings of SAS User Groups Related to Embedded Formats



Display 6. Solution of Use of Embedded Formats

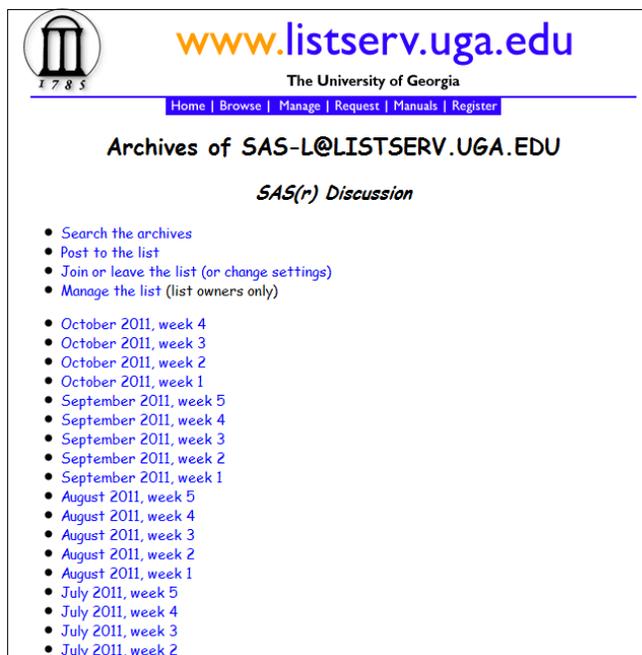
The formats were combined using the example from the paper in Display 6.

```
value $country
  "AFG" = "Afghanistan"
  other = [cntrys.]
;
```

The new format \$COUNTRY will contain all values of CNTRY5 and Afghanistan.

SAS-L

SAS-L can be accessed at <http://listserv.uga.edu/archives/sas-l.html>. It is the most widely used on-line forum of SAS users from all over the world. It has been around for many years. Hence it is quite possible that if one has a problem with SAS then this problem may have been already discussed at SAS-L forum. Fortunately, all the postings within SAS-L archives can be easily searched.



Display 7. SAS-L Home Page

Clicking the "search" link allows one to search the entire archives. The search form in SAS-L is quite flexible and allows filtering the search criteria. Let's assume one needs to quickly find an easy way to randomly split a data set. Searching for "splitting data set", displays a number of search results.

The posted solutions vary in their complexities but a simple and elegant solution is found at the following post.

```
Date: Tue, 6 Mar 2007 14:07:28 -0500
Reply-To: "Droogendyk, Harry" <harry.droogendyk@RBC.COM>
Sender: "SAS(r) Discussion" <SAS-L@LISTSERV.UGA.EDU>
From: "Droogendyk, Harry" <harry.droogendyk@RBC.COM>
Subject: Re: Randomly splitting a dataset
In-Reply-To: <200703061818.126Bkuoe023601@malibu.cc.uga.edu>
Content-Type: text/plain; charset="iso-8859-1"

As non-stats guy I'd do something like:  if ranuni(1) * 10 < 5 then
output a; else output b;

The stat-heads would probably use proc plan or something.

-----Original Message-----
From: owner-sas-l@listserv.uga.edu [mailto:owner-sas-l@listserv.uga.edu]
On Behalf Of New SAS User
Sent: 2007, March, 06 1:19 PM
To: SAS-L@LISTSERV.UGA.EDU
Subject: Randomly splitting a dataset

Hello- I was wondering if anyone can help with SAS coding to randomly
split a dataset into two parts. I have a dataset and I want to randomly
```

Display 8. SAS-L Post on Splitting Datasets

The suggested solution is easy to use:

```
if ranuni(1) * 10 < 5 then  output a;
else output b;
```

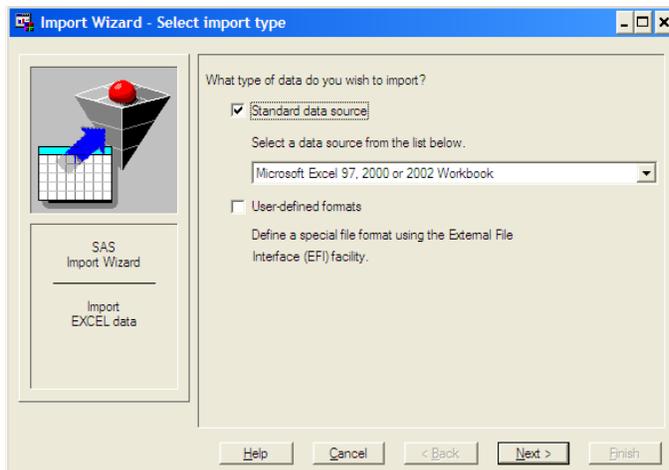
Since any SAS user can post a message, the suggested solutions should always be validated.

SAS-L can also be searched via Google Groups at <http://groups.google.com/group/comp.soft-sys.sas/topics> and at http://www.lexjansen.com/sugi/search_sas-l.php.

Quite often a solution cannot be found by searching the archives of SAS-L. If this happens, the problem can be submitted to SAS-L and somebody will most likely suggest a possible solution. Posting a question requires registering at SAS-L. It is helpful to make the subject of the post as precise as possible when submitting a question. The problem should be clearly explained. If the question requires working with a specific data set, it is recommended to provide code to create at least few observations of such data set. The data set should only contain the required variables and the meaning of the variables should be clear to most SAS users. If there is a problem within a program, then the posted program should contain only relevant code. Posting the entire SAS program is not recommended. The real data should not be posted in most cases.

LET SAS WRITE CODE FOR YOU

Sometimes it is possible to use interactive SAS products when trying to understand how to apply specific SAS syntax. For example, interactive SAS will actually produce SAS statements while importing tab-delimited files.



Display 9. SAS Import Wizard

The import wizard will then generate code to open a text file.

```

data WORK.meds
;
  %let _EFIERR_ = 0; /* set the ERROR detection macro variable */
  infile 'meds.txt' delimiter='09'x MISSOVER DSD lrecl=32767 firstobs=2 ;
  informat Drug_name__verbatim__CMTERM_ $35. ;
  informat ATC_level_1_text__CMATC1_ $46. ;
  format Drug_name__verbatim__CMTERM_ $35. ;
  format ATC_level_1_text__CMATC1_ $46. ;
  input
      Drug_name__verbatim__CMTERM_ $
      ATC_level_1_text__CMATC1_ $
  ;
  if _ERROR_ then call symputx('_EFIERR_',1); /* set ERROR detection macro
variable */
;

```

Such SAS-generated programs are helpful when the use of specific SAS syntax is not clear. Other SAS products that can generate code include SAS/ASSIST®, Graph-N-Go and SAS® Enterprise Guide.

SAS.COM'S KNOWLEDGE BASE

One of the great places to find a SAS solution is at SAS.com's knowledge base page. It offers a large variety of links to various SAS resources and a way to search for a specific SAS problem. The example below shows a survival graph without survival estimates at the time of the last observations when they are censored.

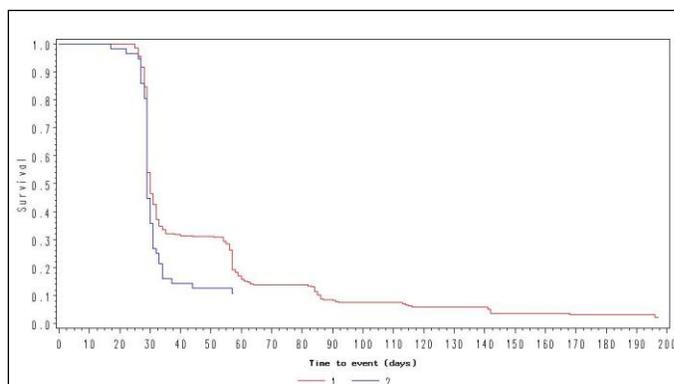


Figure 1. Survival Graph Without the Last Observations

Figure 1 needs to be modified to include estimates at the time of these last censored observations. This can be accomplished by using PROC LIFETEST, however customization options in PROC LIFETEST are limited. By searching the SAS.com's knowledge base page on "Customizing PROC LIFETEST" the following page was found.

Display 10. SAS.com's Knowledge Base Page on Customizing PROC LIFETEST

The example 2 contains a stand-alone program that includes the following DATA step.

```
data mod1;
  set out1(drop=SDF_LCL SDF_UCL);
  by stratum;
  retain lag_s;
  drop lag_s;
  if survival=. then survival=lag_s;
  lag_s=survival;
run;
```

When this DATA step was used in the original program the blue line was extended as can be seen in Figure 2.

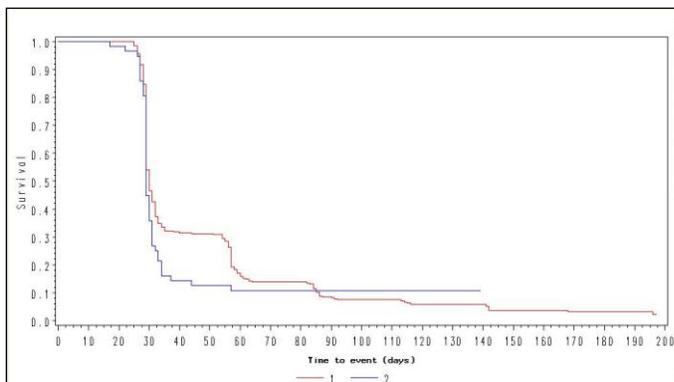


Figure 2. Survival Graph With the Last Observations

sas.com also contains many useful links to other SAS resources such as SAS-L, SAS user group proceedings, focus groups, SAS communities and others. SAS.com can be also searched from a search engine.

SAS TECHNICAL SUPPORT

All of the previous help sources do not guarantee that a problem in SAS code can be solved. The problem may be too complicated, too obscure or require very specific knowledge. However, there is a way to solve practically any problem in a SAS program. This involves directly contacting SAS technical support. Submitting a question to SAS guarantees that the ultimate experts in SAS will rather quickly review the question and come up with a solution. The SAS technical support is provided free of charge for most of the products. The support does not include writing any customized code for the customers, selecting an appropriate statistical methodology or debugging any complex code. However, almost all other questions about any aspects of SAS will be answered and, in many cases, a solution will be suggested. The SAS technical support can be contacted by phone, e-mail or by the specialized web interface. There are different levels of support as explained at <http://support.sas.com/techsup/support.html>. Usually all questions are answered surprisingly fast, from within few hours to a day. SAS also provides a mechanism for asking critical questions requiring an immediate solution. All customers need to provide their company's site number in order to contact SAS for support. The site number can be found in the second note of the SAS log. It can be retrieved from the `sys-site` macro variable or from the "About SAS" window. The support can be contacted at <http://support.sas.com/ctx/supportform/createForm>. All fields can be saved in a user's profile and re-used next time.

Display 11. SAS Technical Support Form

Various files such as SAS programs, log files, output files or SAS data sets can be submitted via the web interface. Sensitive data can be submitted via the interface but it is best to replace sensitive data with dummy data, if possible. Similar principles used to submit a question in SAS-L should be used here. All submitted problems are stored by SAS and can be retrieved later.

The next few examples will illustrate different solutions to SAS coding problems provided by SAS technical support.

EXAMPLE 1. CENTERING A MULTI-LINE VERTICAL AXIS LABEL

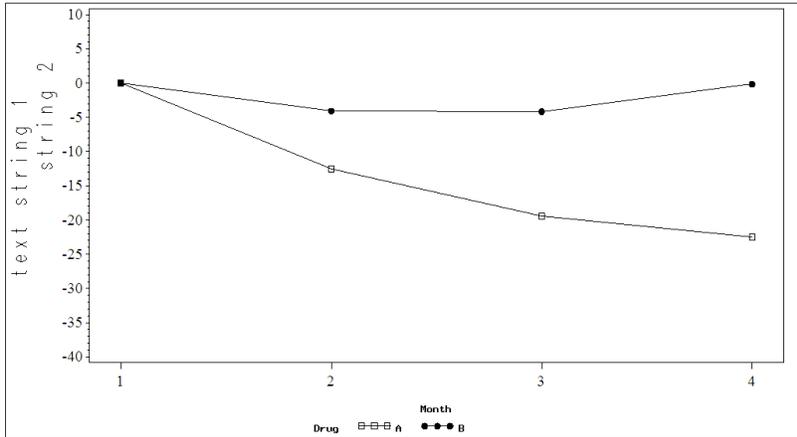


Figure 3. Multi-Line Vertical Axis Labels are Not Centered

The following AXIS statement generated the labels on the y-axis in Figure 3.

```
axis1 order=(-40 to 10 by 5) value=(f="Times New Roman" h=1.5) label=(angle=90 h=2  
j=c "text string 1" justify=c "string 2" );  
proc gplot data= bmi_data ; plot mean*month=Drug / vaxis=axis1 ; run;
```

The second label on the y axis is somehow not centered despite use of JUSTIFY option. The author decided to contact SAS support for a solution. The answer from the SAS support came within few hours via e-mail. According to SAS support, this is a known bug when generating a multi-line vertical axis label. The email included a link to a SAS note describing a problem at <http://support.sas.com/kb/00/615.html>. Additionally, the e-mail suggested code to simulate the vertical axis label with correct results.

```
axis2 label=none;  
title1 angle=90 h=2 justify=c "text string 1" justify=c "string 2";  
proc gplot data= bmi_data ; plot mean*month=Drug / haxis=axis2 ; run;
```

The labels of the y-axis in Figure 4 have been fixed.

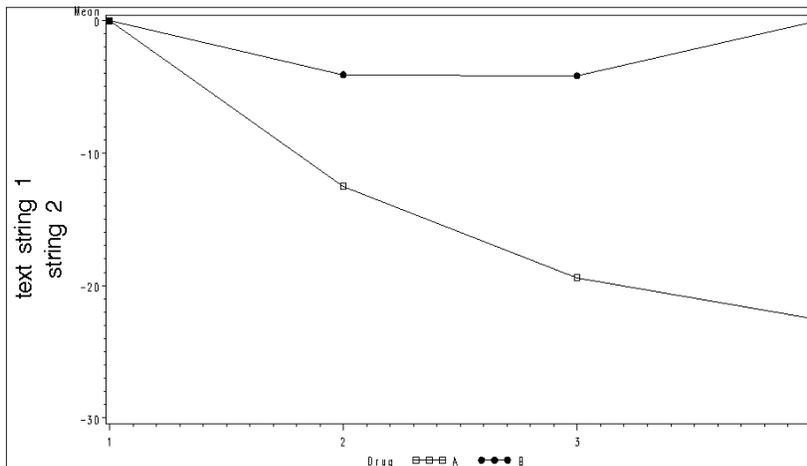


Figure 4. Multi-Line Vertical Axis Labels are Now Centered

EXAMPLE 2. USE OF DATALINES OR CARDS TO CREATE A DATA SET WITHIN A MACRO

Using datalines within a macro causes a SAS error:

```
10 %macro test;
11 options mprint;
12 data test;
13 length trt1 trt2 $11;
14 input trt1 1-11 trt2 12-22 low 22-26 mean 27-31 high 32-35 y 36-38;
15 datalines;
16 10mg/ml BID As needed -4.1 -0.8 2.4 10
17 10mg/ml QID As needed -4.7 -1.7 1.3 9
18 10mg/ml QID As needed -4.7 -1.7 1.3 9
19 ;
20 run;
21
22 %mend test;
23 %test;
MPRINT(TEST): data test;
MPRINT(TEST): length trt1 trt2 $11;
MPRINT(TEST): input trt1 1-11 trt2 12-22 low 22-26 mean 27-31 high 32-35 y 36-38;
MPRINT(TEST): datalines;
```

ERROR: The macro TEST generated CARDS (data lines) for the DATA step, which could cause

Searching SAS-L and other resources found several workarounds but none were appropriate. The author decided to contact SAS support to see if there was an option to incorporate CARDS or DATALINES statements within a macro. The reply from SAS stated the following: "I'm sorry but there is no way around the CARDS/DATALINES issue inside a macro, it just can't be done. The easiest way for you, since you have more than 3 observations, would be to place it in a file and use INPUT/INFILE."

EXAMPLE 3. 32 CHARACTER LIMIT PLACED ON BAR VALUES WITH PROC GCHART

The following code generates Figure 5.

```
axis2 label=('%' order=0 to 100 by 10;
axis1 label=none;
title "Percent of subjects with AEs of interest";
proc gchart data=aes;
  hbar ae / discrete sumvar= prct nostats raxis=axis2 maxis=axis1;
run;
```

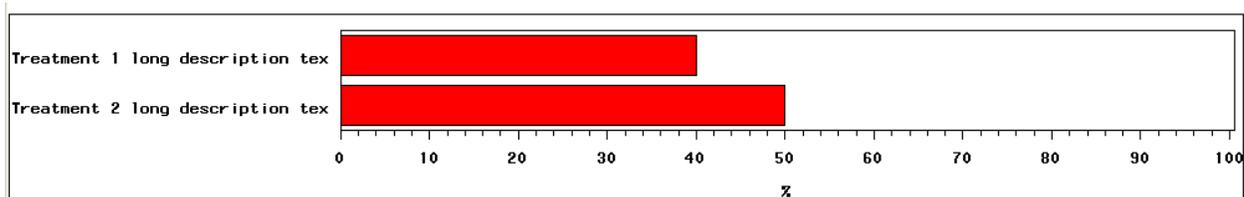


Figure 5. Graph with Truncated Text in Bar Values

The word "text" is truncated because SAS places the 32-character limit on bar values with PROC GCHART. This problem can be fixed using DATA ANNOTATE facility but the author wanted to avoid using DATA ANNOTATE. The author received the following e-mail after contacting SAS support:

```
Hello Max,
This is in regards to SAS tracking number 7610271127, where you
asked about circumventing the 32 character limit placed on bar values with PROC
GCHART. Below is a link illustrating how to circumvent this issue. Let me know if
you have any follow-up question.
...SAS/GRAPH Technical Support
```

<http://support.sas.com/kb/24885>

The solution in the link used a macro variable to create y-axis labels.

```
/* Create macro variables MAXIS2 and TOTAL. The      */
/* TOTAL macro variable contains the total number  */
/* of observations in the data set. The END=option  */
/* on the SET statement creates the variable EOF    */
/* that signals the end-of file.                  */
data _null_;
  set a end=eof;
  call symput('maxis2' || left(_n_),"' ' || trim(maxis1) || "'");
  if eof then do;
    call symput('total',_n_);
  end;
run;

/* The MCDOLOOP macro is used to pass the long character */
/* string to the VALUE= option in the AXIS statement in the */
/* PROC GCHART step.                                     */
%macro mcdoloop;
  %do i=1 %to &total;
    &&maxis2&i
  %end;
%mend mcdoloop;

/* Create axis characteristics. The values of the macro */
/* variables generated by the %DO loop in MCDOLOOP macro change */
/* for each observation.                                 */

axis1 value=(%mcdoloop) label=none;
axis2 label=('%' ) order=0 to 100 by 10;

title "Percent of subjects with AEs of interest";
proc gchart data=aes;
  hbar ae / discrete sumvar= prct nostats raxis=axis2 maxis=axis1;
run;
```

The resulting graph in Figure 6 displays bar values, which are no longer truncated.

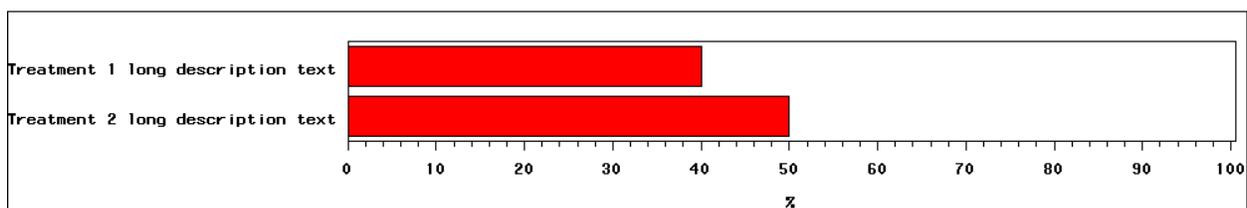


Figure 6. Bar Values are no Longer Truncated

Contacting SAS technical support is the best option when faced with a difficult problem.

ADDITIONAL SOURCES OF SAS HELP

SASCOMMUNITY.ORG

There are few other additional ways where one may try obtaining help. <http://www.sascommunity.org> is a relatively new site created by SAS users. Its design is similar to that of Wikipedia. It contains numerous links to various SAS resources such as list of local SAS users group, SAS literature, proceedings of SAS user groups and other useful links.

CODE SEARCH ENGINES

There are a number of dedicated code search engines. Entering a description of a problem may result in bringing up a specific program. One example is the Google code search. Unfortunately, very few search engines include SAS as most are focused on more popular software packages.

SAS BOOKS

SAS Institute publishes a wide variety of books that often provide one of the best ways to understand specific aspects of SAS. For example, the author has been able to greatly increase his understanding of PROC REPORT by reading the "SAS Technical Report P-258 Using the REPORT Procedure in a Nonwindowing Environment". This book can be downloaded free of charge at http://support.sas.com/documentation/onlinedoc/v82/techreport_p258.pdf.

CONCLUSION

There are many ways to find help to a specific SAS problem. The solutions to most problems can be found by reviewing the SAS documentation, searching Internet, SAS-L forum or browsing SAS user group proceedings. SAS-L actually allows posting a question to a worldwide community of experts. Ultimately, contacting SAS technical support is the best way to quickly resolve a SAS coding problem although there may be cases when posting a question at SAS-L may lead to a more creative and elegant solution.

Help source	Main advantages	Limitations
SAS help facility	<ul style="list-style-type: none"> • Contains information on the entire SAS syntax. • Can be searched for a keyword. • Multiple examples are provided. 	<ul style="list-style-type: none"> • Sometimes hard to find exactly the right information. • Examples do not cover the entire syntax.
Consulting a colleague	<ul style="list-style-type: none"> • Quick and informal way to get help. 	<ul style="list-style-type: none"> • Solutions will depend on one's colleagues' expertise and experience. • Not everyone is comfortable asking for help.
Internet search	<ul style="list-style-type: none"> • Most SAS resources such as SAS-L, sas.com or SAS user group proceedings are accessible via a search engine. 	<ul style="list-style-type: none"> • Too many search results.
SAS generated code	<ul style="list-style-type: none"> • Easy way to obtain help with SAS syntax 	<ul style="list-style-type: none"> • Limited number of DATA step functions or procedures
Proceedings of SAS user groups	<ul style="list-style-type: none"> • Contain thousands of papers on various SAS topics 	<ul style="list-style-type: none"> • Sometimes hard to find exactly the right information.
SAS-L	<ul style="list-style-type: none"> • Entire archive can be searched • Ability to post a question 	<ul style="list-style-type: none"> • Maybe difficult to find exactly the right information • Need to verify the suggested solution • Some discussions involve numerous threads which may be hard to follow
SAS.com	<ul style="list-style-type: none"> • Large resource of SAS solutions 	<ul style="list-style-type: none"> • Difficult to navigate
SAS technical support	<ul style="list-style-type: none"> • The best way to get help. • Contacting SAS will usually lead to quickly finding the right solution. 	<ul style="list-style-type: none"> • Suggested solutions may not be the most creative.

Table 1. Comparison of various approaches to solve a SAS problem

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Problem with your SAS® Program? Solutions abound!, continued

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<http://support.sas.com/documentation/onlinedoc/91pdf/index.html>

Droogendyk, H. (2007, March 6). Re: Randomly splitting a data set [Online discussion group]. Retrieved from <http://listserv.uga.edu/cgi-bin/wa?A2=ind0703A&L=sas-l&P=R26425>

ACKNOWLEDGMENTS

Author would like to thank Greg Cicconetti, Ph.D. for his help with this paper.

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