Paper 407-2013

Statistical Analyses Using SAS® Enterprise Guide®

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ABSTRACT

Conducting statistical analyses involves choosing proper methods, understanding model assumptions and displaying clear results. The latest releases of SAS® Enterprise Guide® offer conveniences, such as point-and-click wizards and integrated syntax help, to ease the burden on users. This tutorial demonstrates how to perform statistics quickly and easily using some handy features of SAS Enterprise Guide. Examples of multiple linear regression, logistic regression and survival analysis are covered as well as some hints on how to navigate Enterprise Guide menus. This tutorial is intended for SAS users with beginning to intermediate experience with the above mentioned statistics and basic experience with SAS Enterprise Guide.

INTRODUCTION

This paper was created for the Tutorial section of 2011 Western Users of SAS Software (WUSS) conference. The main purpose of this tutorial is to demonstrate ways to conduct statistical analyses using the many available tasks and functions in Enterprise Guide. It is intended for SAS programmers with less experience with Enterprise Guide but knowledge of commonly used statistical methods. One common misconception of Enterprise Guide is that users cannot perform all the functions available in Display Manager, or the traditional SAS BASE application. This paper demonstrates that Enterprise Guide leverages the powerful capabilities of SAS combined with a user friendly interface.

SAS® Enterprise Guide® is described (EG Fact Sheet) as “an easy-to-use interface” that allows users “to access the power of SAS data access, reporting and analytics, enabling you to quickly create and publish SAS Stored Processes that can be leveraged from Microsoft Office applications or Web browsers.”

This figure taken from the SAS website is a visualization of the description above. It accurately displays how the powerful SAS engine is under the hood of the nice graphical user interface of Enterprise Guide allowing users to perform jobs quickly and easily.

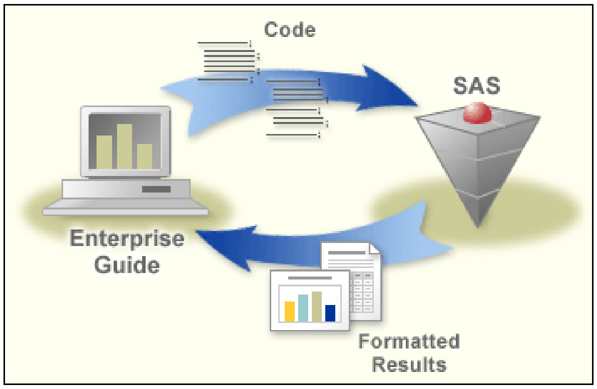


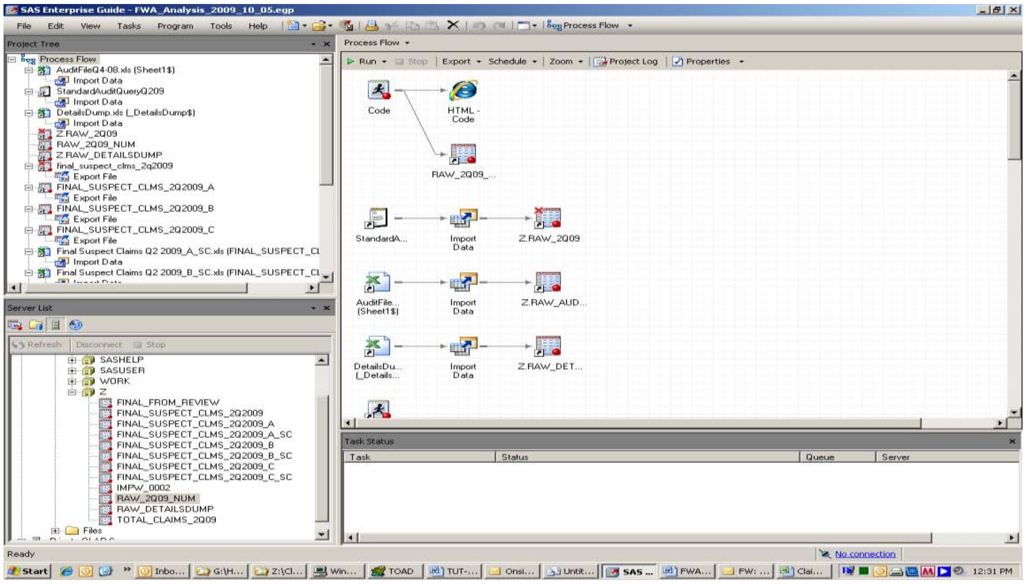
Figure 1. SAS Enterprise Guide

GETTING FAMILIAR WITH THE ENTERPRISE GUIDE INTERFACE

This section is a brief overview on the Enterprise Guide interface. For those familiar with the look of Enterprise Guide, please look forward to the next sections of this paper.

At first glance, the application looks very menu driven and can be unpleasant to traditional SAS programmers. It took me a while to reconcile the log and output windows. After time, I came to realize that the interface has many more features than the Display Manager seen in SAS. The key to getting accustomed to Enterprise Guide is learning how to work with process flows.

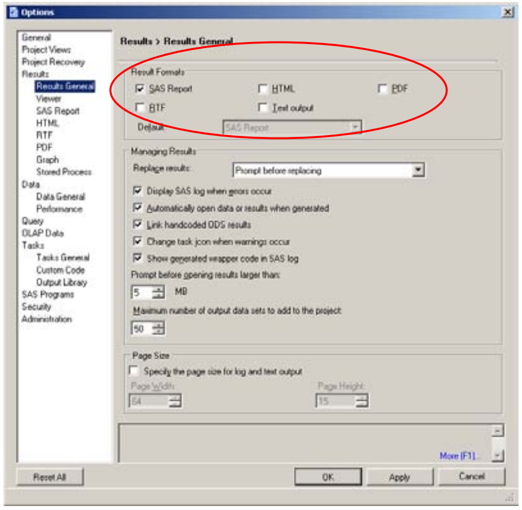
First, all work is organized in one file called a **Project** with the file extension “.epg”. A sample project is shown below. All code, data, log and output are contained in the project and represented as **Nodes** (the icons) shown in the **Process Flow** window below. So the process flow represents your desktop that charts all your work. I find this process flow window useful because projects can be broken into steps. For example, instead of 1000 lines of code in one program that don't have natural breaks you can have 4 or 5 programs as steps within a process flow. This is explained later in the paper. You can always export all code to a single program file by going to **File → Export → Export All Code**. The **Process Flow** and **Project Tree** windows give programmers an easy view of your entire project. You can also pull existing SAS programs into your project with shortcuts (non-embedded programs) or place the programs into the project (embedded programs).


SAS Enterprise Guide - FWA_Analysis_2009_10_05.egp
File Edit View Tasks Program Tools Help
Process Flow
Project Tree
Process Flow
AuditFileQ4-08.xls (Sheet1$)
Import Data
StandardAuditQueryQ209
Import Data
DetailsDump.xls (_DetailsDump$)
Import Data
Z.RAW_2Q09
RAW_2Q09_NUM
Z.RAW_DETAILSDUMP
final_suspect_clms_2q2009
Export File
FINAL_SUSPECT_CLMS_2Q2009_A
Export File
FINAL_SUSPECT_CLMS_2Q2009_B
Export File
FINAL_SUSPECT_CLMS_2Q2009_C
Export File
Final Suspect Claims Q2 2009_A_SC.xls (FINAL_SUSPECT_CL
Import Data
Final Suspect Claims Q2 2009_B_SC.xls (FINAL_SUSPECT_CL
Run Stop Export Schedule Zoom Project Log Properties
Code
HTML - Code
RAW_2Q09_...
StandardA...
Import Data
Z.RAW_2Q09
AuditFile... (Sheet1$)
Import Data
Z.RAW_AUD...
DetailsDu... (_Details...
Import Data
Z.RAW_DET...
Server List
Refresh Disconnect Stop
SASHELP
SASUSER
WORK
Z
FINAL_FROM_REVIEW
FINAL_SUSPECT_CLMS_2Q2009
FINAL_SUSPECT_CLMS_2Q2009_A
FINAL_SUSPECT_CLMS_2Q2009_A_SC
FINAL_SUSPECT_CLMS_2Q2009_B
FINAL_SUSPECT_CLMS_2Q2009_B_SC
FINAL_SUSPECT_CLMS_2Q2009_C
FINAL_SUSPECT_CLMS_2Q2009_C_SC
IMPW_0002
RAW_2Q09_NUM
RAW_DETAILSDUMP
TOTAL_CLAIMS_2Q09
Files
Task Status
Task Status Queue Server
Ready
No connection
Start
12:31 PM

Display 1. SAS Enterprise Guide Interface

CHANGING SAS ENTERPRISE GUIDE SETTINGS

If you would like to change the Enterprise Guide environment such as Project Tree views and outputted results, go to the **Tools → Options**. The most relevant option for this tutorial is the **Results→ Results General** option, where you change the format of your output. You can choose to generate SAS Report, HTML, PDF, RTF, and/or text files.



Results > Results General

Result Formats

☑ SAS Report ☐ HTML ☐ PDF
☐ RTF ☐ Text output
Default: SAS Report

Managing Results

Replace results: Prompt before replacing

☑ Display SAS log when errors occur
☑ Automatically open data or results when generated
☑ Link handcoded ODS results
☑ Change task icon when warnings occur
☑ Show generated wrapper code in SAS log

Prompt before opening results larger than: 5 MB

Maximum number of output data sets to add to the project: 50

Page Size

☐ Specify the page size for log and text output
Page Width: 64 Page Height: 15

Display 2. Changing your Environment with the Options Menu

EXAMPLE 1: LINEAR REGRESSION

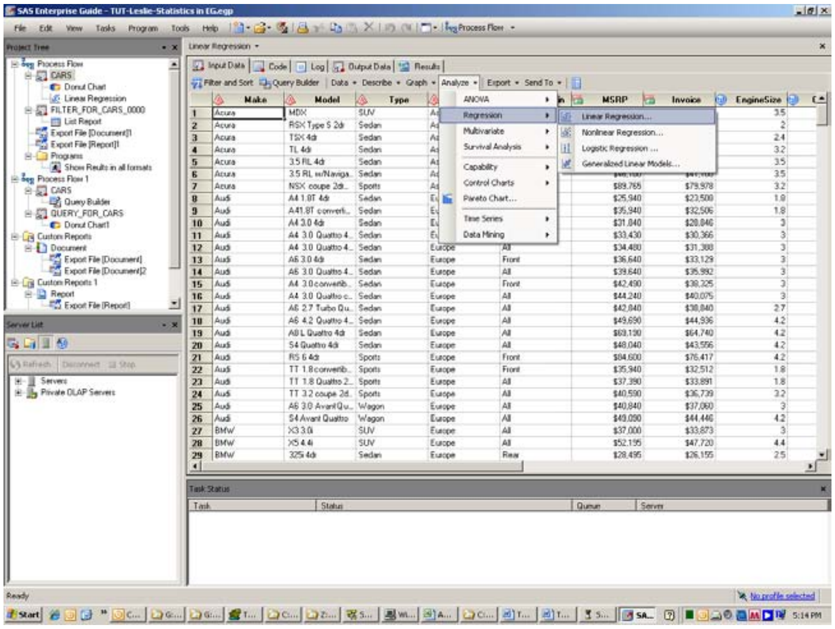
The next two examples of this paper use the SASHELP.CARS data set available from the SASHELP library. This data set has 428 observations and 15 variables. It basically contains data for make and models of cars, such as miles per gallon, number of cylinders, cost, etc. The data set contains 5 character variables, 2 currency variables and 8 numeric variables. The first step is to import the data set into your project by using the menus **File→ Open→ Data** (browse to SASHELP library)

To demonstrate multiple linear regression, the CARS data set is used to check for possible relationships between number of cylinders of the car, weight, length and gas mileage in the city (MPG_City). So the model equation would be,

$MPG\_city = ß_0 + ß_1 Cyclinders + ß_2 Length + ß_3 Weight + \epsilon$

Where MPG_City is a function of the variables cylinders, length and weight plus an error term

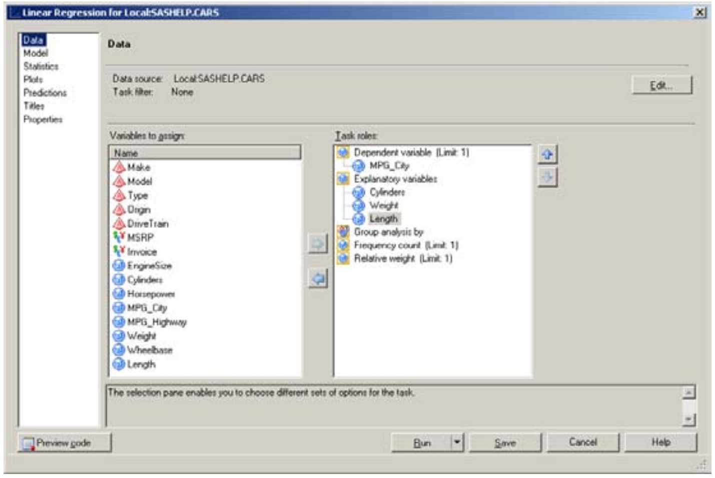
Once opening the CARS data set into your project by using the menus **File→ Open→ Data** (browse to SASHELP library), you can use the Context tabs at the top of the data set to run linear regression analysis. Here's a view of the data set and drop down menu for linear regression.



	Make	Model	Type		in	MSRP	Invoice	EngineSize
1	Acura	MDX	SUV	A				3.5
2	Acura	RSX Type S 2dr	Sedan	A				2
3	Acura	TSX 4dr	Sedan	A				2.4
4	Acura	TL 4dr	Sedan	A				3.2
5	Acura	3.5 RL 4dr	Sedan	A				3.5
6	Acura	3.5 RL w/Naviga...	Sedan	A				3.5
7	Acura	NSX coupe 2dr...	Sports	A		$89,765	$79,978	3.2
8	Audi	A4 1.8T 4dr	Sedan	E		$25,940	$23,508	1.8
9	Audi	A41.8T converti...	Sedan	E		$35,940	$32,506	1.8
10	Audi	A4 3.0 4dr	Sedan	E		$31,840	$28,846	3
11	Audi	A4 3.0 Quattro 4...	Sedan	E		$33,430	$30,366	3
12	Audi	A4 3.0 Quattro 4...	Sedan	Europe	All	$34,480	$31,388	3
13	Audi	A6 3.0 4dr	Sedan	Europe	Front	$36,640	$33,129	3
14	Audi	A6 3.0 Quattro 4...	Sedan	Europe	All	$39,640	$35,992	3
15	Audi	A4 3.0 convertib...	Sedan	Europe	Front	$42,490	$38,325	3
16	Audi	A4 3.0 Quattro c...	Sedan	Europe	All	$44,240	$40,075	3
17	Audi	A6 2.7 Turbo Qu...	Sedan	Europe	All	$42,840	$38,840	2.7
18	Audi	A6 4.2 Quattro 4...	Sedan	Europe	All	$49,690	$44,936	4.2
19	Audi	A8 L Quattro 4dr	Sedan	Europe	All	$69,190	$64,740	4.2
20	Audi	S4 Quattro 4dr	Sedan	Europe	All	$48,040	$43,556	4.2
21	Audi	RS 6 4dr	Sports	Europe	Front	$84,600	$76,417	4.2
22	Audi	TT 1.8 convertib...	Sports	Europe	Front	$35,940	$32,512	1.8
23	Audi	TT 1.8 Quattro 2...	Sports	Europe	All	$37,390	$33,891	1.8
24	Audi	TT 3.2 coupe 2d...	Sports	Europe	All	$40,590	$36,739	3.2
25	Audi	A6 3.0 Avant Qu...	Wagon	Europe	All	$40,840	$37,060	3
26	Audi	S4 Avant Quattro	Wagon	Europe	All	$49,090	$44,446	4.2
27	BMW	X3 3.0i	SUV	Europe	All	$37,000	$33,873	3
28	BMW	X5 4.4i	SUV	Europe	All	$52,195	$47,720	4.4
29	BMW	325i 4dr	Sedan	Europe	Rear	$28,495	$26,155	2.5

Display 3. Using Context Menu to Run Linear Regression

Once launching the Linear Regression menu, the task wizard opens allowing the user to select the dependent and independent variables plus select many other options.



Data

Data source: Local:SASHELP.CARS
Task filter: None

Variables to assign:

Name
Make
Model
Type
Origin
DriveTrain
MSRP
Invoice
EngineSize
Cylinders
Horsepower
MPG_City
MPG_Highway
Weight
Wheelbase
Length

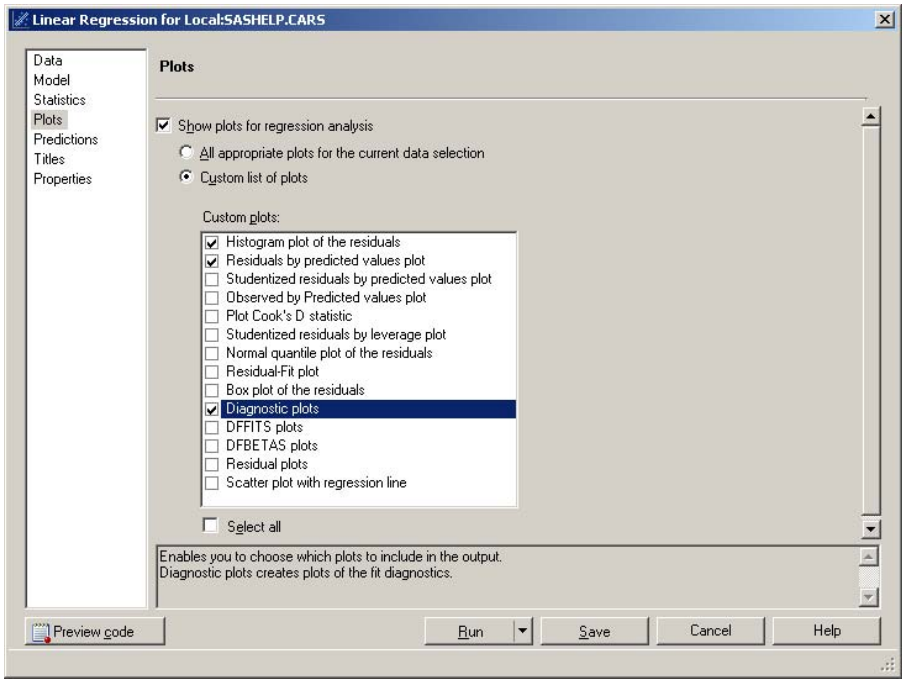
Task roles:

Dependent variable (Limit: 1)
MPG_City
Explanatory variables
Cylinders
Weight
Length
Group analysis by
Frequency count (Limit: 1)
Relative weight (Limit: 1)

The selection pane enables you to choose different sets of options for the task.

Display 4. Linear Regression Options

The user is also able to perform a variety of linear regression diagnostics to check for assumptions of multiple linear regression (e.g., linearity, normality, independence, equal variance), identify influential data points and check for correlations between variables (e.g., weight and length of car) to check for possible multicollinearity problems. You can also output predicted values and create diagnostic plots.



Plots

☑ Show plots for regression analysis

○ All appropriate plots for the current data selection

● Custom list of plots

Custom plots:

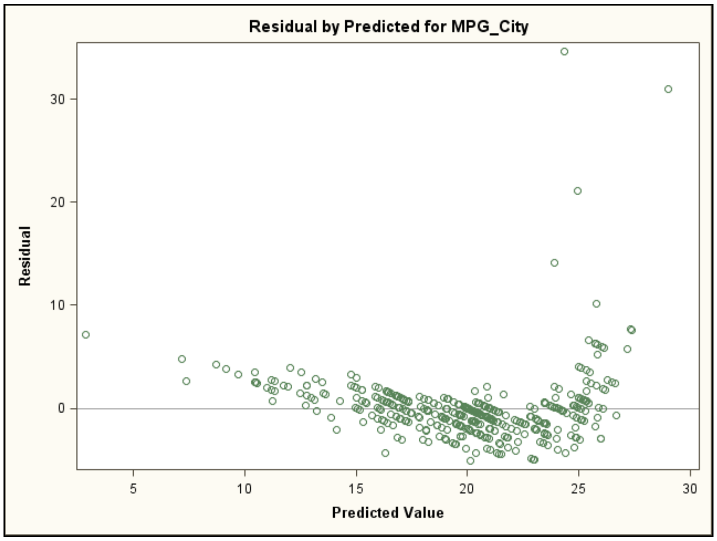
- ☑ Histogram plot of the residuals
- ☑ Residuals by predicted values plot
- ☐ Studentized residuals by predicted values plot
- ☐ Observed by Predicted values plot
- ☐ Plot Cook's D statistic
- ☐ Studentized residuals by leverage plot
- ☐ Normal quantile plot of the residuals
- ☐ Residual-Fit plot
- ☐ Box plot of the residuals
- ☑ Diagnostic plots
- ☐ DFFITS plots
- ☐ DFBETAS plots
- ☐ Residual plots
- ☐ Scatter plot with regression line

☐ Select all

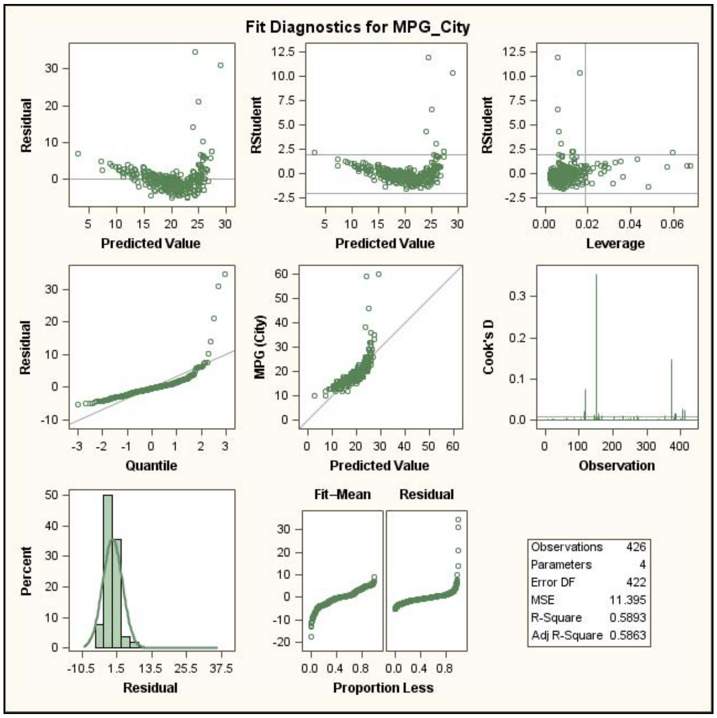
Enables you to choose which plots to include in the output.
Diagnostic plots creates plots of the fit diagnostics.

Display 5. Plot Menu in the Linear Regression Task

For example the Residual by Predicted Value plot can be used to assess the linearity assumption. You can also get a panel of Fit Diagnostics.



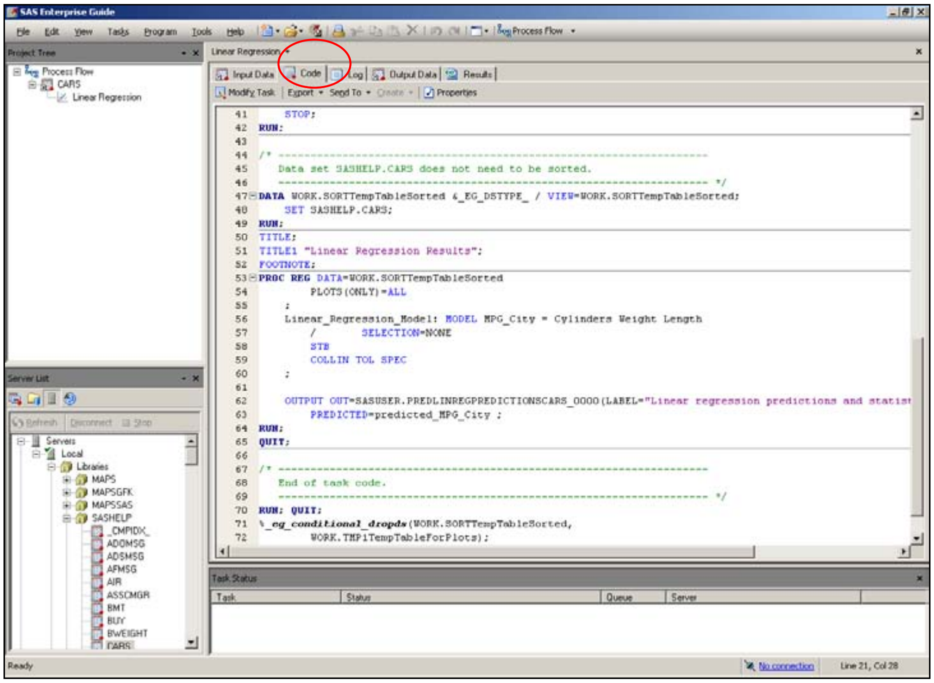
Output 1. Predicted Value Plot from a Linear Regression Task



Observations	426
Parameters	4
Error DF	422
MSE	11.395
R-Square	0.5893
Adj R-Square	0.5863

Output 2. Fit Diagnostics Panel from a Linear Regression Task

Task wizards run code very quickly without writing the code. But you can add and change code when needed. After running a task wizard, the code that Enterprise Guide creates to generate the analysis is viewable and modifiable. I find this easy to copy this code into a new program and then make any necessary modifications. This allows you to leverage Enterprise Guide to write the code and learn additional SAS syntax. The window below shows the PROC REG code generated when running the Wizard. The code is created and accessible to you from the Code tab in the Context Menu. This feature (new starting with version 4.2) allows users to modify and re-run tasks quickly and easily. In the project explorer window, selecting the tab opens the code for viewing. You can now edit the code and rerun.



```
    STOP;
RUN;

/* -------------------------------------------------------------------
   Data set SASHELP.CARS does not need to be sorted.
   ------------------------------------------------------------------- */
DATA WORK.SORTTempTableSorted &_EG_DSTYPE_ / VIEW=WORK.SORTTempTableSorted;
    SET SASHELP.CARS;
RUN;
TITLE;
TITLE1 "Linear Regression Results";
FOOTNOTE;
PROC REG DATA=WORK.SORTTempTableSorted
        PLOTS(ONLY)=ALL
    ;
    Linear_Regression_Model: MODEL MPG_City = Cylinders Weight Length
        /       SELECTION=NONE
        STB
        COLLIN TOL SPEC
    ;

    OUTPUT OUT=SASUSER.PREDLINREGPREDICTIONSCARS_0000(LABEL="Linear regression predictions and statist
        PREDICTED=predicted_MPG_City ;
RUN;
QUIT;

/* -------------------------------------------------------------------
   End of task code.
   ------------------------------------------------------------------- */
RUN; QUIT;
%_eg_conditional_dropds(WORK.SORTTempTableSorted,
        WORK.TMP1TempTableForPlots);
```

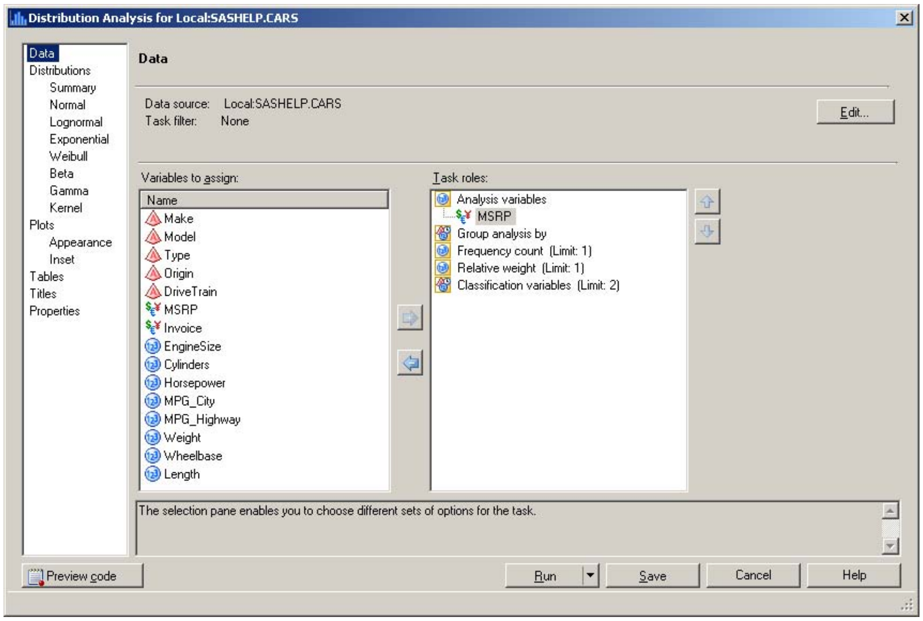
Display 6. Modifying Task-Generated Code to Re-Run a Linear Regression Task

EXAMPLE 2: LOGISTIC REGRESSION

Logistic regression is a statistical technique to describe the relationship of several independent variables to a dichotomous dependent variable. Using the SASHELP.CARS data set we could check for relationships between car characteristics and manufacturer's suggested retail price of the car (MSRP) if we categorize the MSRP price by high or not high using an arbitrary threshold. Selecting type of car, origin and horsepower as possible explanatory variables the model equation would be,

$$P\ (\mathit{High\ priced\ car}) = 1/\ 1 + e^{\,-\,(\text{ά} + \text{ß}1\mathit{Origin} + \text{ß}2\mathit{Horsepower} + \text{є})}$$

To make the dependent variable dichotomous you could create a new variable, high priced car indicator variable, to flag those observations that are considered high priced. A look at the distribution of the MSRP variable using the Distribution Analysis Task wizard can give ideas on where to create a threshold for "high price". After opening the CARS data set into your project by using the menus **File→ Open→ Data** (browse to SASHELP library), you can use the Context tabs at the top of the data set to run a distribution analysis. Here's a view of the data set and drop down menu for distribution analysis.



Data

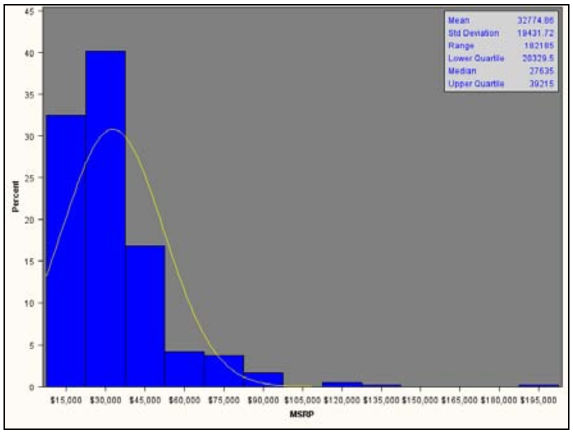
Data source: Local:SASHELP.CARS
Task filter: None

Analysis variables
MSRP

The selection pane enables you to choose different sets of options for the task.

Display 7. Distribution Analysis Task

Here's the resulting histogram.

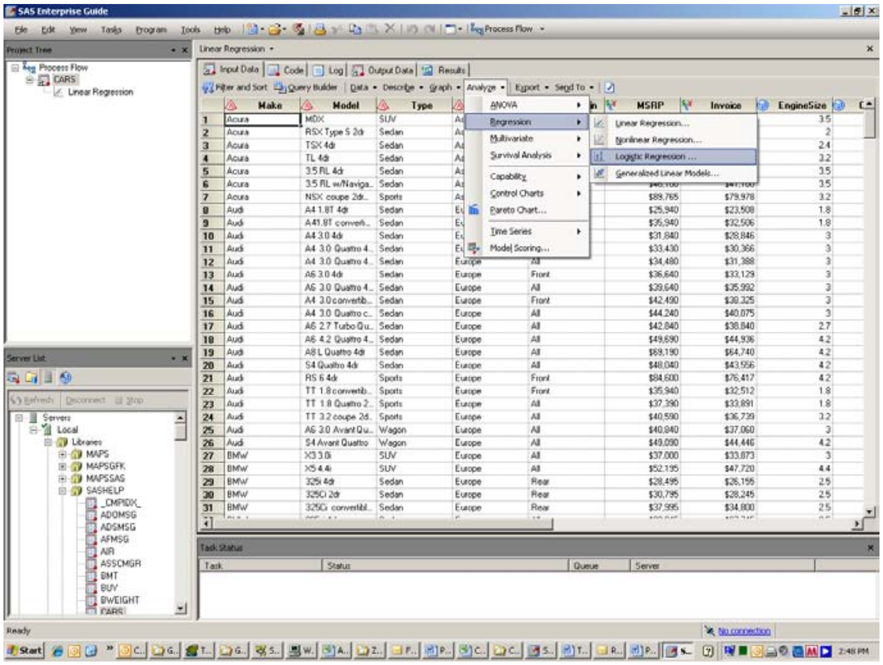


Output 3. Histogram from a Distribution Task

Using the upper quartile as the threshold to indicate a high-priced car, a data step could be used to create a new variable, “MSRP_HIGH” with values of 1=yes and 0=no.

```
DATA CARS;
FORMAT MSRP_HIGH 8.;
SET SASHELP.CARS;
IF MSRP >= 39215 THEN MSRP_HIGH=1;
ELSE MSRP_HIGH=0;
LABEL MSRP_HIGH='HIGH-PRICED CAR';
RUN;
```

Now from this new data set, the same analyze context menu can launch the logistic regression task wizard. This is shown below.



	Make	Model	Type		n	MSRP	Invoice	EngineSize
1	Acura	MDX	SUV	As				3.5
2	Acura	RSX Type S 2dr	Sedan	As				2
3	Acura	TSX 4dr	Sedan	As				2.4
4	Acura	TL 4dr	Sedan	As				3.2
5	Acura	3.5 RL 4dr	Sedan	As				3.5
6	Acura	3.5 RL w/Naviga...	Sedan	As				3.5
7	Acura	NSX coupe 2dr...	Sports	As		$89,765	$79,978	3.2
8	Audi	A4 1.8T 4dr	Sedan	Eu		$25,940	$23,508	1.8
9	Audi	A41.8T converti...	Sedan	Eu		$35,940	$32,506	1.8
10	Audi	A4 3.0 4dr	Sedan	Eu		$31,840	$28,846	3
11	Audi	A4 3.0 Quattro 4...	Sedan	Eu		$33,430	$30,366	3
12	Audi	A4 3.0 Quattro 4...	Sedan	Europe	All	$34,480	$31,388	3
13	Audi	A6 3.0 4dr	Sedan	Europe	Front	$36,640	$33,129	3
14	Audi	A6 3.0 Quattro 4...	Sedan	Europe	All	$39,640	$35,992	3
15	Audi	A4 3.0 convertib...	Sedan	Europe	Front	$42,490	$38,325	3
16	Audi	A4 3.0 Quattro c...	Sedan	Europe	All	$44,240	$40,075	3
17	Audi	A6 2.7 Turbo Qu...	Sedan	Europe	All	$42,840	$38,840	2.7
18	Audi	A6 4.2 Quattro 4...	Sedan	Europe	All	$49,690	$44,936	4.2
19	Audi	A8 L Quattro 4dr	Sedan	Europe	All	$69,190	$64,740	4.2
20	Audi	S4 Quattro 4dr	Sedan	Europe	All	$48,040	$43,556	4.2
21	Audi	RS 6 4dr	Sports	Europe	Front	$84,600	$76,417	4.2
22	Audi	TT 1.8 convertib...	Sports	Europe	Front	$35,940	$32,512	1.8
23	Audi	TT 1.8 Quattro 2...	Sports	Europe	All	$37,390	$33,891	1.8
24	Audi	TT 3.2 coupe 2d...	Sports	Europe	All	$40,590	$36,739	3.2
25	Audi	A6 3.0 Avant Qu...	Wagon	Europe	All	$40,840	$37,060	3
26	Audi	S4 Avant Quattro	Wagon	Europe	All	$49,090	$44,446	4.2
27	BMW	X3 3.0i	SUV	Europe	All	$37,000	$33,873	3
28	BMW	X5 4.4i	SUV	Europe	All	$52,195	$47,720	4.4
29	BMW	325i 4dr	Sedan	Europe	Rear	$28,495	$26,155	2.5
30	BMW	325Ci 2dr	Sedan	Europe	Rear	$30,795	$28,245	2.5
31	BMW	325Ci convertibl...	Sedan	Europe	Rear	$37,995	$34,800	2.5

Task	Status	Queue	Server

Display 8. Modifying Task-Generated Code to Re-Run a Linear Regression Task

Select results of the output are shown below. Odds ratio estimates using this data set find that cars from Europe are over 14 times more likely to be high-priced than those cars from the USA and cars from Asia are almost 43% less likely to be high-priced than cars from the USA. Also, there are increased odds of the car being high-priced with increasing horsepower. The wizard has an option in to specify the units for quantitative variables. Horsepower in units of 10 is shown in the second odds ratio estimates table.

Analysis of Maximum Likelihood Estimates						
Parameter		DF	Estimate	Standard Error	Wald Chi-Square	Pr > ChiSq
Intercept		1	-11.8989	1.3434	78.4466	<.0001
Horsepower		1	0.0441	0.00524	70.8717	<.0001
Origin	**Asia**	1	-1.2661	0.3035	17.4020	<.0001
Origin	**Europe**	1	1.9644	0.2974	43.6392	<.0001

Odds Ratio Estimates			
Effect	Point Estimate	95% Wald Confidence Limits	
Horsepower	1.045	1.034	1.056
Origin Asia vs USA	0.567	0.213	1.508

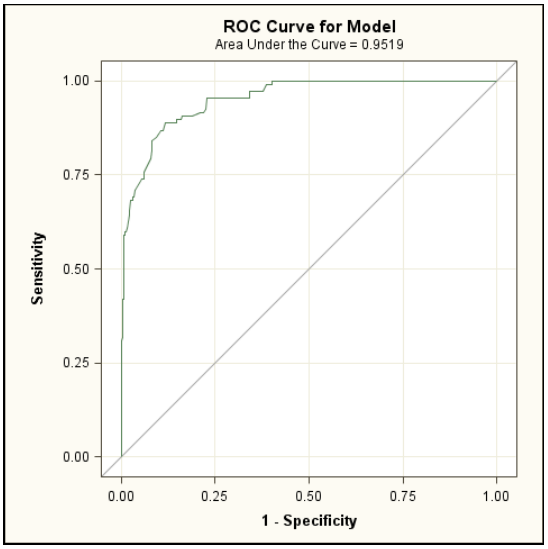
Odds Ratio Estimates			
Effect	Point Estimate	95% Wald Confidence Limits	
Origin Europe vs USA	14.337	5.508	37.321

Odds Ratios		
Effect	Unit	Estimate
Horsepower	10.0000	1.555

Output 4. Output from a Logistic Regression Task

Options in the wizard also allow you to run regression diagnostics to identify influential data points and check for the fit of the specified model. You can also output predicted values and create ROC plots. As shown in the table below, Hosmer-Lemeshow Goodness-of-fit test was unable to reject the null hypothesis (good fit).

Hosmer and Lemeshow Goodness-of-Fit Test		
Chi-Square	DF	Pr > ChiSq
5.3671	8	0.7177

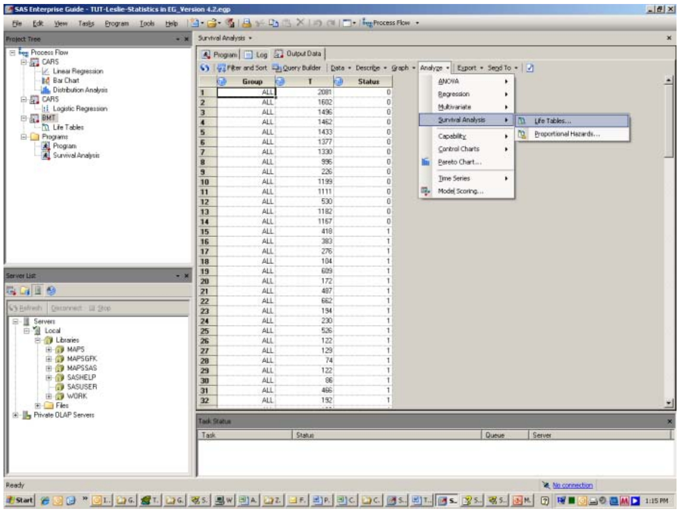


Output 5. Output from a Linear Regression Task

EXAMPLE 3: SURVIVAL ANALYSIS

Survival analysis is a collection of statistical methods used to analyze time to event data. To show how Enterprise Guide can perform survival analyses, Example 49.2 Enhanced Survival Plot and Multiple-Comparison Adjustments from the SAS Help and Documentation is used. This example uses data from Klein and Moeschberger (Klein, J.P. and Moeschberger, M.L. (1997), Survival Analysis: Techniques for Censored and Truncated Data, New York: Springer-Verlag) that contains data on 137 bone marrow transplant patients. Variables in the data set includes a group variable (3 categories of risk), disease-free survival time (time to death or relapse or the end of the study), and a status variable that indicates censored observations.

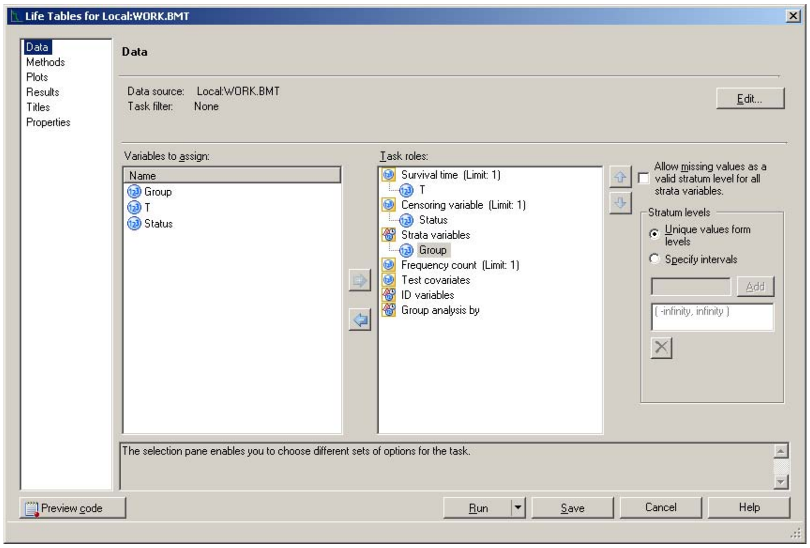
Once the data is in the project, you can run the survival analysis using the menus as seen in the window below.



	Group	T	Status
1	ALL	2081	0
2	ALL	1602	0
3	ALL	1496	0
4	ALL	1462	0
5	ALL	1433	0
6	ALL	1377	0
7	ALL	1330	0
8	ALL	996	0
9	ALL	226	0
10	ALL	1199	0
11	ALL	1111	0
12	ALL	530	0
13	ALL	1182	0
14	ALL	1167	0
15	ALL	418	1
16	ALL	383	1
17	ALL	276	1
18	ALL	104	1
19	ALL	609	1
20	ALL	172	1
21	ALL	487	1
22	ALL	662	1
23	ALL	194	1
24	ALL	230	1
25	ALL	526	1
26	ALL	122	1
27	ALL	129	1
28	ALL	74	1
29	ALL	122	1
30	ALL	86	1
31	ALL	466	1
32	ALL	192	1

Display 9. Using Context Menu to Run Survival Analysis

Using the wizard you can assign the Strata (group), Survival Time (time) and Censoring (status) variables.



Data

Data source: Local:WORK.BMT
Task filter: None

Variables to assign:

Name
Group
T
Status

Task roles:

Survival time (Limit: 1)
T
Censoring variable (Limit: 1)
Status
Strata variables
Group
Frequency count (Limit: 1)
Test covariates
ID variables
Group analysis by

☐ Allow missing values as a valid stratum level for all strata variables.

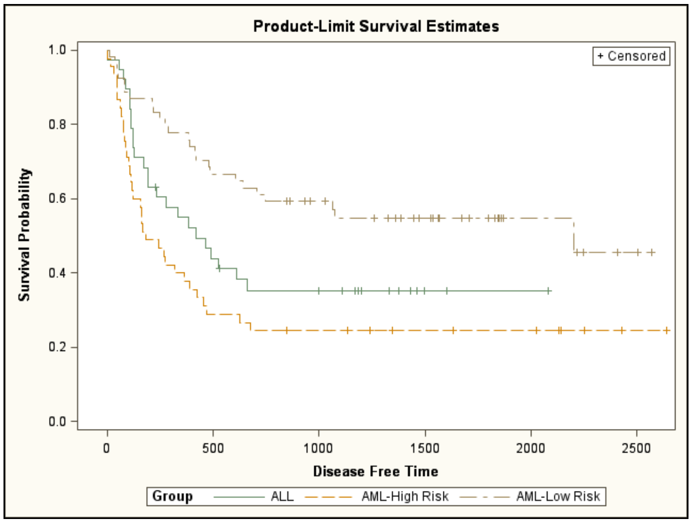
Stratum levels
● Unique values form levels
○ Specify intervals
[-infinity, infinity]

The selection pane enables you to choose different sets of options for the task.

Display 10. Survival Analysis Task Options

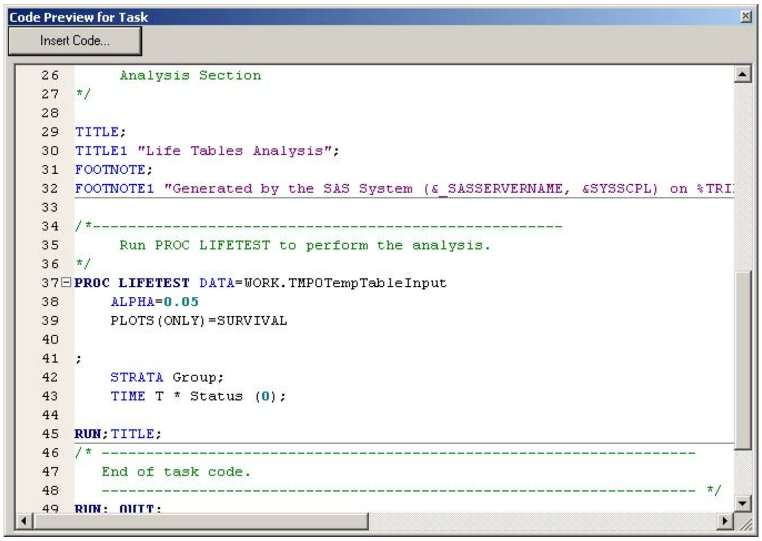
In the Methods window, the use can choose the method of estimation and select a plot of the estimated survival curves in the Plots window. In this case the product-limit estimation (Kaplan Meier) method is used. Parts of the results are shown below.

Test of Equality over Strata			
Test	**Chi-Square**	**DF**	**Pr > Chi-Square**
Log-Rank	13.8037	2	0.0010
Wilcoxon	16.2407	2	0.0003
-2Log(LR)	19.5313	2	<.0001



Output 6. Output from a Survival Analysis Task

As shown earlier in the paper, you can add and change code as needed. After running a task wizard, the code that Enterprise Guide creates is viewable and modifiable. The window below shows a preview of the PROC LIFETEST code to be used when running the wizard. You can insert code using the Insert Code tab.



```
     Analysis Section
*/

TITLE;
TITLE1 "Life Tables Analysis";
FOOTNOTE;
FOOTNOTE1 "Generated by the SAS System (&_SASSERVERNAME, &SYSSCPL) on %TRI

/*-----------------------------------------------------
     Run PROC LIFETEST to perform the analysis.
*/
PROC LIFETEST DATA=WORK.TMP0TempTableInput
    ALPHA=0.05
    PLOTS(ONLY)=SURVIVAL

;
    STRATA Group;
    TIME T * Status (0);

RUN;TITLE;
/* -------------------------------------------------------------------
   ------------------------------------------------------------------- */
RUN; QUIT;
```

Display 11. Modifying Task-Generated Code to Re-Run a Survival Analysis Task

For instance, you can add the following code to the STRATA statement to get pairwise comparisons.

```
   / test=logrank adjust=sidak diff=control('AML-Low Risk');
```

The result of rerunning this code is below.

Adjustment for Multiple Comparisons for the Logrank Test				
Strata Comparison			p-Values	
Group	Group	Chi-Square	Raw	Sidak
ALL	AML-Low Risk	5.1400	0.0234	0.0462
AML-High Risk	AML-Low Risk	13.8011	0.0002	0.0004

Output 7. Output from a Survival Analysis Task

SAS® ENTERPRISE GUIDE® VERSIONS 4.3 AND 5.1

The analyses and work shown in this paper was done in Enterprise Guide version 4.2. More recent versions, 4.3 and 5.1, include additional features. The most noteworthy new features are a new program editor with autocomplete and integrated syntax help. These features complete and show syntax while you are coding (e.g., typing PROC in the program editor will create a pop-up window that lists all available procedures for you to choose from). Visit the What's New in Enterprise Guide 4.3 website for details. Also, the paper SAS® Programmer's Paradise: New Goodies in SAS® Enterprise Guide® 4.3 by SAS Institute® describes many of the new features of EG 4.3.

CONCLUSION

Enterprise Guide allows programmers to conduct statistical analyses. Adding a few lines of code in combination with the many drop-down menus allow users to run programs efficiently and even pass on to analysts or persons less familiar with programming.

REFERENCES

- SAS Fact Sheet, Accessed 3/09/13 http://www.sas.com/technologies/bi/query_reporting/guide/factsheet.pdf
- Getting Started with SAS Enterprise Guide – free learning tutorial available at http://support.sas.com/documentation/onlinedoc/guide/tut42/en/menu.htm
- Fernandez, George. “Quick and Complete Statistical Analyses Using SAS Enterprise Guide”. http://www.wuss.org/proceedings08/08WUSS%20Proceedings/papers/tut/tut04.pdf
- Hallahan, Charles and Atkinson, Linda. “Introduction to SAS® Enterprise Guide® 4.1 for Statistical Analysis”. *Proceedings of the SUGI 31 Conference*. Paper 109-31. http://www2.sas.com/proceedings/sugi31/109-31.pdf
- SAS tutorial http://support.sas.com/learn/statlibrary/statlib_eg4.1/top_learn.htm

RECOMMENDED READING

- Little SAS Book for Enterprise Guide 4.2 – By Susan J. Slaughter, Lora D. Delwiche, http://www.sas.com/apps/pubscat/bookdetails.jsp?catid=1&pc=61861
- Data Analysis Using SAS Enterprise Guide- By Lawrence S. Meyers, Glenn Gamst and A. J. Guarino Cambridge University Press, 2009. http://www.cambridge.org/gb/knowledge/isbn/item6026601/?site_locale=en_GB

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