sas innovate 2026

The (ODS) Output of Your Desires:

a Tool-kit for Creating Designer Reports and Data Sets

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Author Biography

Louise Hadden presented at her first SAS conference in 1996 and has never looked back, presenting at multiple conferences across the continent over the years. She supports file building and analytic programming for life sciences organizations, most frequently as a contractor for government agencies such as CMS and CDC, and specializes in reporting and data visualization.

Introduction

- ODS delivers what used to be printed output in many convenient forms.
- SAS® packages a collection of items that come out of a procedure that most people want to see in a predefined order (aka template.)
- ODS TRACE, ODS TRACE DOM, ODS OUTPUT, ODS SELECT, ODS EXCLUDE, ODS destinations, ODS print system options, and SAS metadata can help.

Session Agenda

- Address the opportunity to harness the power of SAS's Output Delivery System (ODS) and ODS Output Objects to create highly customized reports and data sets.
- Learn how to trace, manipulate, and repurpose ODS output objects using tools like ODS TRACE, ODS OUTPUT, and SAS reporting.
- Go for a deep dive into some less known capabilities of ODS, providing tools and concepts to easily transform procedural output into designer-quality reports.

Creating a Test Data Set

Creating a Test SAS Data Set

- Based on the SASHELP.HEART data set
- Data set contains demographics, medical data, and common risk factors for cardiovascular disease (CVD).
- Additional elements added include a group variable (HeartID), an ID variable (seqnum), Sample Weight, BMI, BMI Category, binaries for female and male, and Obesity Category.
- Missing variable labels are also added.

Creating a Test SAS Data Set

```
data out1.heart (label="Enhanced version of
SASHELP.HEART");
      set sashelp.heart;

*** create missing variable labels;

      label status="Status"
      sex="Sex"
      height="Height"
      weight="Weight"
      Diastolic="Diastolic Blood Pressure"
      Systolic="Systolic Blood Pressure"
      Smoking="Smoking Status"
      Cholesterol="Cholesterol Status";
```

Creating a Test SAS Data Set

```
*** create a faux group variable;
      HeartID=modz(_n_,4);

*** create a faux id;
      SeqNum=_n_;

*** create a faux weight;
      SampleWeight=1+mod(_n_,10);
```

Creating a Test SAS Data Set

```
*** create BMI variables;
         bmi= weight / height**2 * 703;
      select;
         when (1 le bmi lt 18.5) bmi_cat = 1; . . .
         otherwise  bmi_cat = .;
      end;
      select;
         when (1 le bmi lt 30) obesity_cat = 1; . .
.
         otherwise  obesity_cat = .;
      end;
```

Creating a Test SAS Data Set

```
select;
   when (sex='Female') female = 1;
       otherwise  female = 0;
end;
select;
    when (sex='Male') male = 1;
       otherwise male = 0;
end;
```

Creating a Test SAS Data Set

```
    label        HeartID="Heart Group Variable"
                 SeqNum="Sequence Number"
                 bmi="BMI"
                 bmi_cat="BMI Category"
                 obesity_cat="Obesity Category"
                 SampleWeight="Sample Weight"
                 male="Binary: Male"
                 female="Binary: Female";
run;
```

Identifying ODS Output Objects: ODS TRACE

How to train your ODS Output Objects

1. Identify / locate your ODS output object(s) using ODS TRACE or output data set(s) .
2. Analyze your ODS output object(s) or output data set(s) using basic SAS procedures and review.
3. Manipulate your ODS output object(s) or output data set(s) using SAS data steps, ODS options, and/or procedures.
4. Report on your final data set(s).

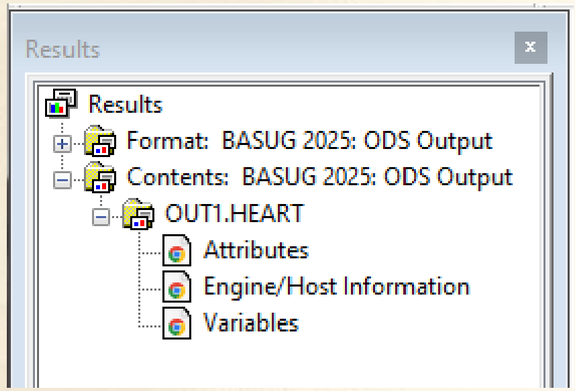
How to train your ODS Output Objects

```
ods trace on / label listing;
    ods rtf file=yourfilename.rtf'
          path=odsout
style=styles.journal2;
    ods graphics on;
        . . . your procedures here . . .
    ods rtf close;
    ods graphics off;
ods trace off;
```

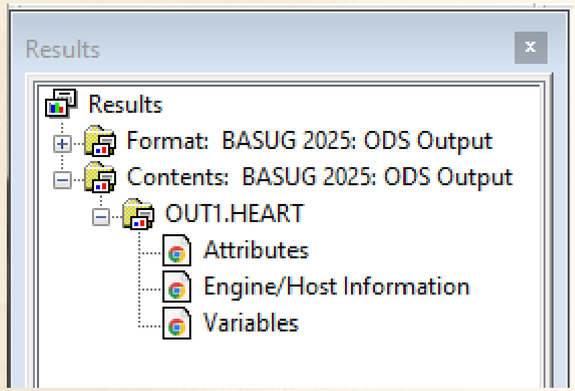
How to train your ODS Output Objects

```
ods trace on / listing;

proc contents data=out1.heart
   order=collate;
title2 "Contents of modified Heart db -
   Order=Collate - ODS TRACE";
run;

ods trace off;
```

How to train your ODS Output Objects



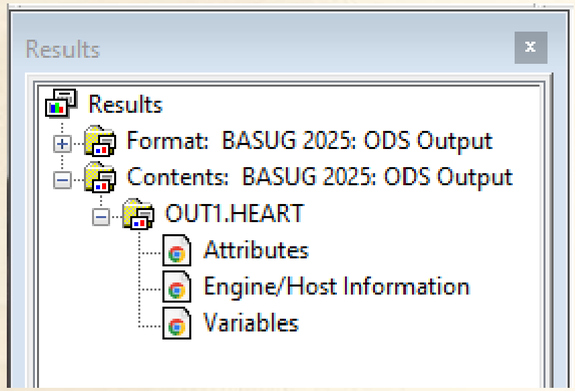
How to train your ODS Output Objects



BASUG 2025: ODS Output
Contents of Heart - Order=Collate - ODS TRACE

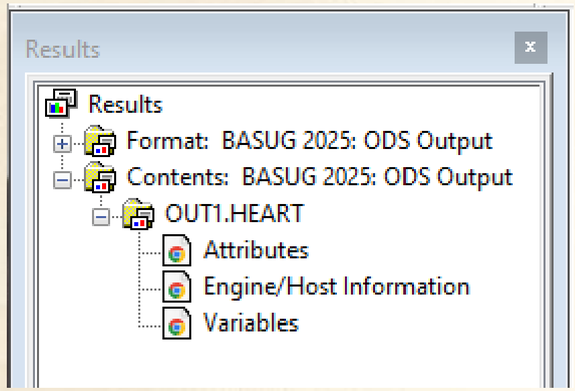
Data Set Name	OUT1.HEART	Observations	5209
Member Type	DATA	Variables	25
Engine	V9	Indexes	0
Created	06/21/2025 15:36:00	Observation Length	232
Last Modified	06/21/2025 15:36:00	Deleted Observations	0
Protection		Compressed	NO
Data Set Type		Sorted	NO
Label	Enhanced version of SASHELP.HEART		
Data Representation	WINDOWS_64		
Encoding	wlatin1 Western (Windows)		

How to train your ODS Output Objects



Engine/Host Dependent Information	
Data Set Page Size	65536
Number of Data Set Pages	19
First Data Page	1
Max Obs per Page	282
Obs in First Data Page	265
Number of Data Set Repairs	0
ExtendObsCounter	YES
Filename	C:\Users\Owner\OneDrive\Documents\SASConferences\BASUG\SASOutput\heart.sas7bdat
Release Created	9.0401M8
Host Created	X64_10PRO
Owner Name	DESKTOP-D0C3DPU\Owner
File Size	1MB
File Size (bytes)	1310720

How to train your ODS Output Objects

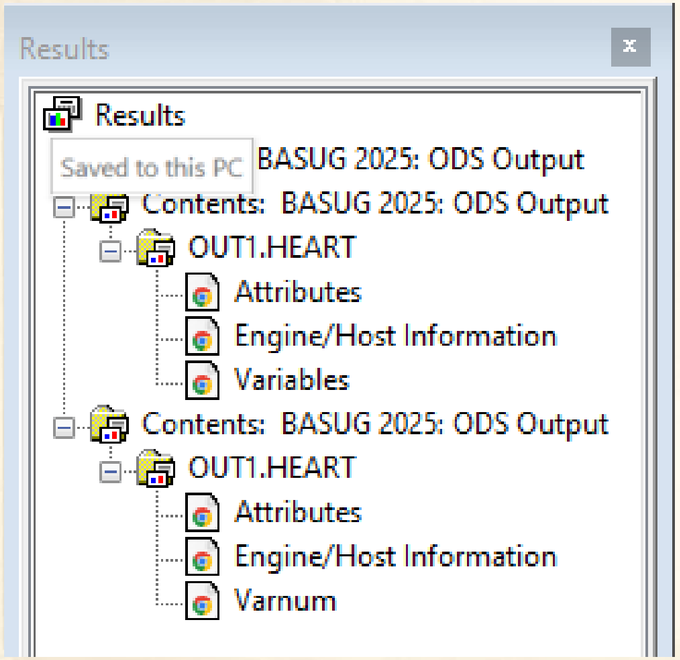


Alphabetic List of Variables and Attributes				
#	Variable	Type	Len	Label
12	AgeAtDeath	Num	8	Age at Death
5	AgeAtStart	Num	8	Age at Start
3	AgeCHDdiag	Num	8	Age CHD Diagnosed
15	BP_Status	Char	7	Blood Pressure Status
14	Chol_Status	Char	10	Cholesterol Status
13	Cholesterol	Num	8	
2	DeathCause	Char	26	Cause of Death
8	Diastolic	Num	8	
6	Height	Num	8	
10	MRW	Num	8	Metropolitan Relative Weight
4	Sex	Char	6	
11	Smoking	Num	8	
17	Smoking_Status	Char	17	Smoking Status
1	Status	Char	5	
9	Systolic	Num	8	
7	Weight	Num	8	
16	Weight_Status	Char	11	Weight Status

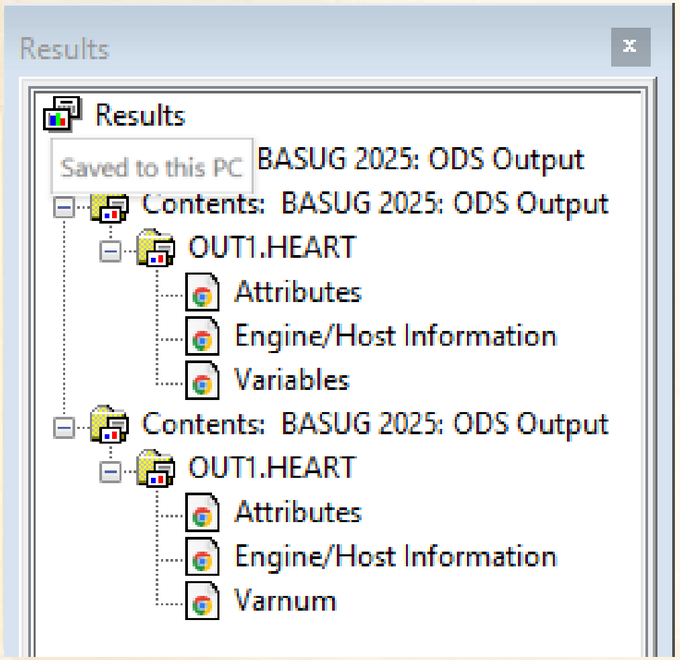
How to train your ODS Output Objects

```
ods trace on / listing;

proc contents data=out1.heart
   order=varnum;
title2 "Contents of modified Heart db -
   Order=Varnum - ODS TRACE";
run;

ods trace off;
```

How to train your ODS Output Objects



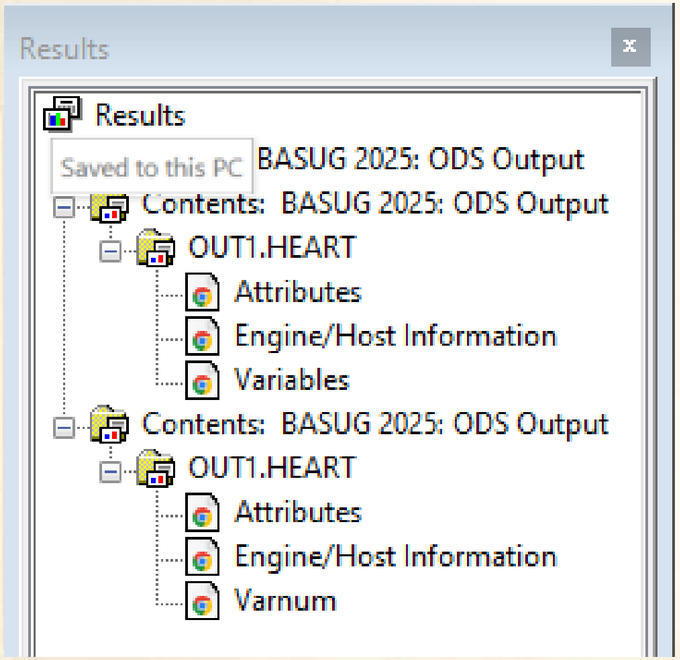
How to train your ODS Output Objects



BASUG 2025: ODS Output
Contents of Heart - Order=VARNUM - ODS TRACE

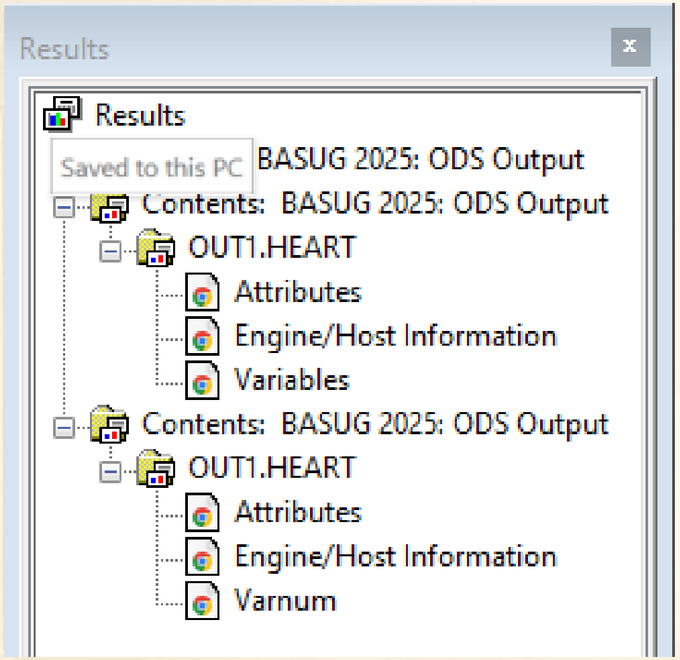
Data Set Name	OUT1.HEART	Observations	5209
Member Type	DATA	Variables	25
Engine	V9	Indexes	0
Created	06/21/2025 15:36:00	Observation Length	232
Last Modified	06/21/2025 15:36:00	Deleted Observations	0
Protection		Compressed	NO
Data Set Type		Sorted	NO
Label	Enhanced version of SASHELP.HEART		
Data Representation	WINDOWS_64		
Encoding	wlatin1 Western (Windows)		

How to train your ODS Output Objects



Engine/Host Dependent Information	
Data Set Page Size	65536
Number of Data Set Pages	19
First Data Page	1
Max Obs per Page	282
Obs in First Data Page	265
Number of Data Set Repairs	0
ExtendObsCounter	YES
Filename	C:\Users\Owner\OneDrive\Documents\SASConferences\BASUG\SASOutput\heart.sas7bdat
Release Created	9.0401M8
Host Created	X64_10PRO
Owner Name	DESKTOP-D0C3DPU\Owner
File Size	1MB
File Size (bytes)	1310720

How to train your ODS Output Objects



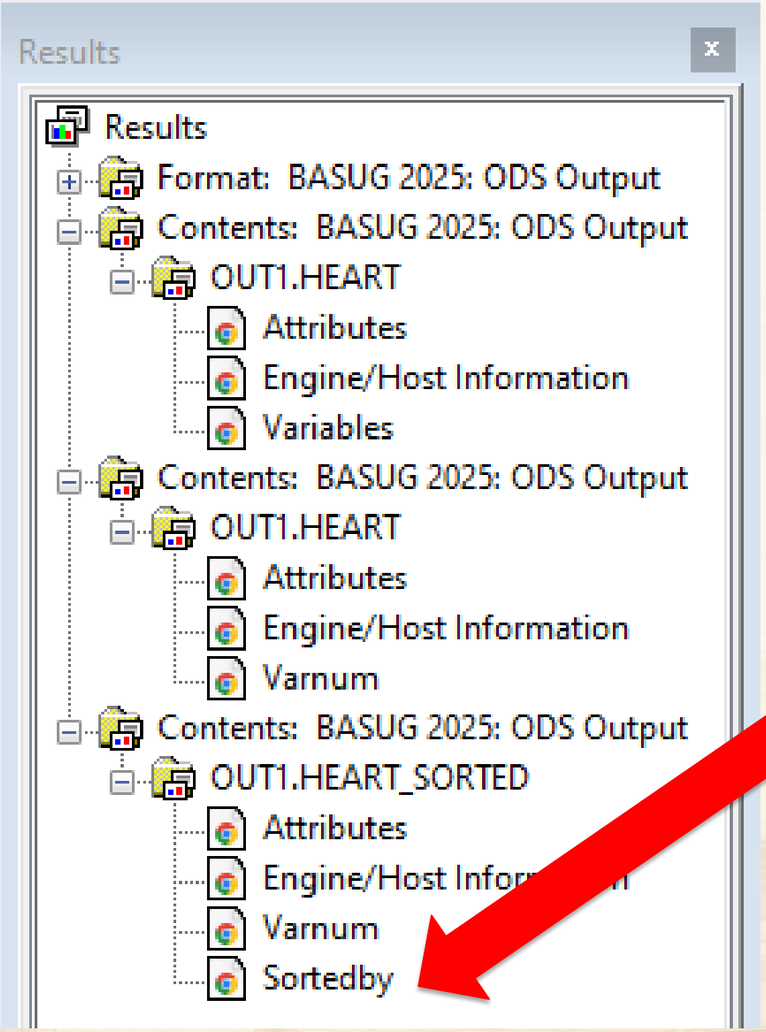
Variables in Creation Order

#	Variable	Type	Len	Label
1	Status	Char	5	Status
2	DeathCause	Char	26	Cause of Death
3	AgeCHDdiag	Num	8	Age CHD Diagnosed
4	Sex	Char	6	Sex
5	AgeAtStart	Num	8	Age at Start
6	Height	Num	8	Height
7	Weight	Num	8	Weight
8	Diastolic	Num	8	Diastolic Blood Pressure
9	Systolic	Num	8	Systolic Blood Pressure
10	MRW	Num	8	Metropolitan Relative Weight
11	Smoking	Num	8	Smoking Status
12	AgeAtDeath	Num	8	Age at Death
13	Cholesterol	Num	8	Cholesterol Status
14	Chol_Status	Char	10	Cholesterol Status
15	BP_Status	Char	7	Blood Pressure Status
16	Weight_Status	Char	11	Weight Status
17	Smoking_Status	Char	17	Smoking Status
18	HeartID	Num	8	Heart Group Variable
19	SeqNum	Num	8	Sequence Number
20	SampleWeight	Num	8	Sample Weight
21	bmi	Num	8	BMI
22	bmi_cat	Num	8	BMI Category
23	obesity_cat	Num	8	Obesity Category
24	female	Num	8	Binary: Female
25	male	Num	8	Binary: Male

How to train your ODS Output Objects

```
proc sort data=out1.heart
   out=out1.heart_sorted;
   by seqnum;
run;

ods trace on;

proc contents data=out1.heart_sorted
varnum;
title2 "Contents on Sorted Data Set";
run;

ods trace off;
```

How to train your ODS Output Objects

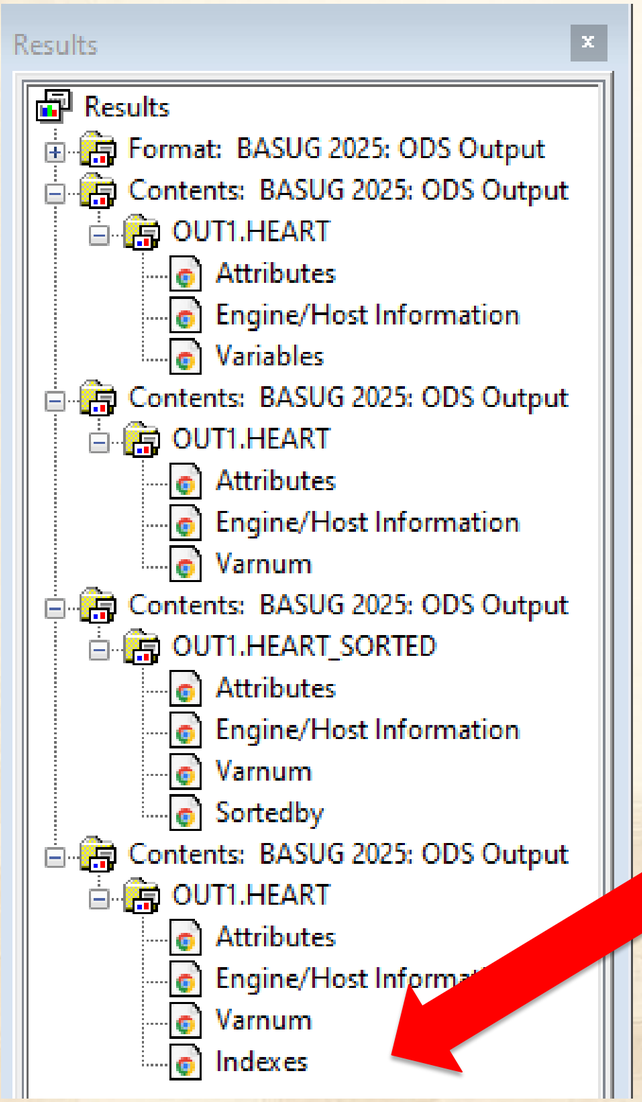


Sort Information	
Sortedby	SeqNum
Validated	YES
Character Set	ANSI

How to train your ODS Output Objects

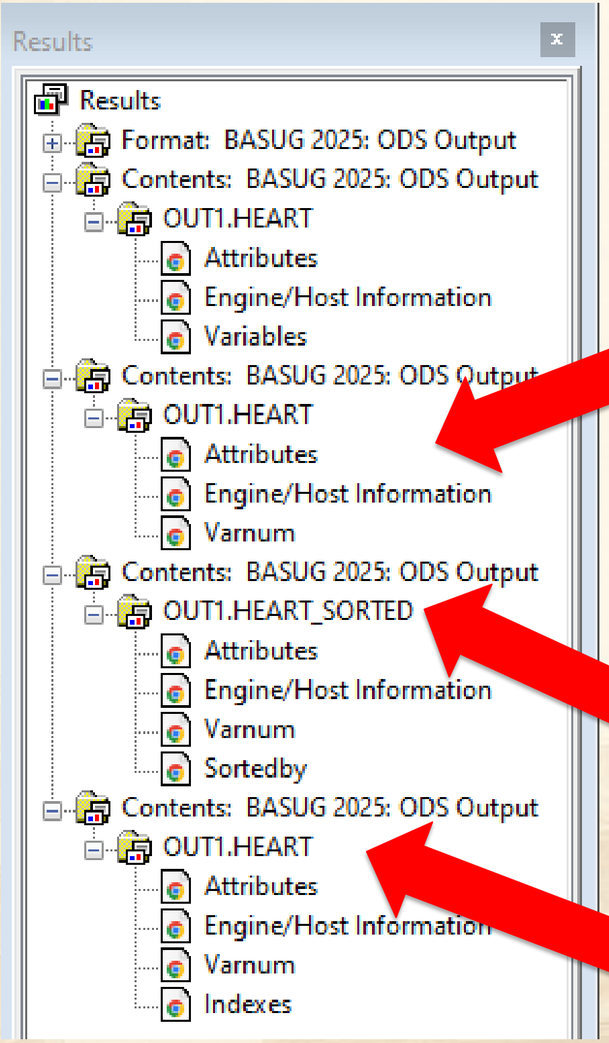
```
proc datasets library=out1 nolist;
   modify heart;
   index create id=(seqnum heartid) /
   nomiss unique;
quit;

ods trace on;

proc contents data=out1.heart varnum;
title2 "Contents - Add Index";
run;

ods trace off;
```

How to train your ODS Output Objects



Alphabetic List of Indexes and Attributes					
#	Index	Unique Option	NoMiss Option	# of Unique Values	Variables
1	id	YES	YES	5209	SeqNum HeartID

How to train your ODS Output Objects




```
Output Added:
-------------
Name:        Attributes
Label:       Attributes
Template:    Base.Contents.Attributes
Path:        Contents.DataSet.Attributes
-------------

Output Added:
-------------
Name:        EngineHost
Label:       Engine/Host Information
Template:    Base.Contents.EngineHost
Path:        Contents.DataSet.EngineHost
-------------

Output Added:
-------------
Name:        Position
Label:       Varnum
Template:    Base.Contents.Position
Path:        Contents.DataSet.Position
-------------
```

```
Output Added:
-------------
Name:        Sortedby
Label:       Sortedby
Template:    Base.Contents.Sortedby
Path:        Contents.DataSet.Sortedby
-------------
```

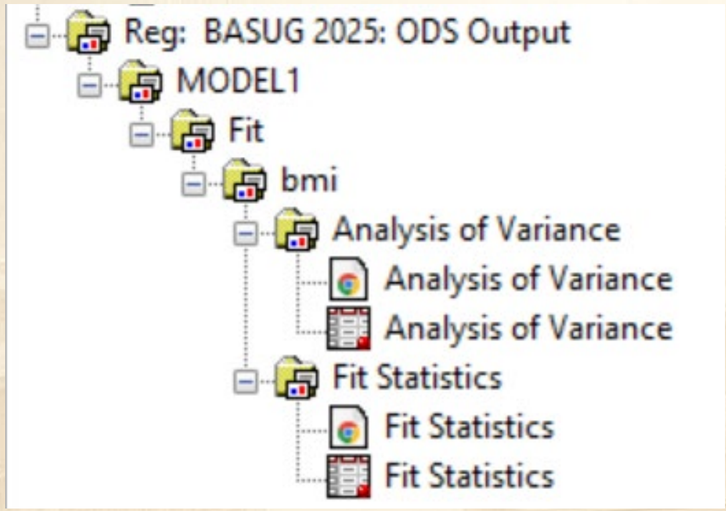
```
Output Added:
-------------
Name:        Indexes
Label:       Indexes
Template:    Base.Contents.Indexes
Path:        Contents.DataSet.Indexes
```

ODS SHOW, SELECT, EXCLUDE

ODS SELECT, SHOW

```
ods select FitStatistics Anova;
ods show;
ods output anova=anova1 fitstatistics=fitstatistics;
proc reg data=out1.heart PLOTS(MAXPOINTS=NONE);
  model bmi = weight ageatstart height;
title2 "PROC REG: SELECT Fit and Anova";
run;
ods output close;
quit;

ods select all;
run;
```

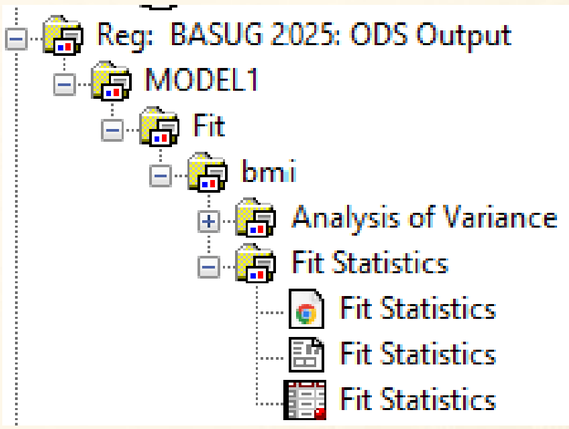
```
1171  ods select FitStatistics Anova;
1172  ods show;
Current OVERALL select list is:
1. FitStatistics
2. Anova
1173  ods output anova=anova1 fitstatistics=fitstatistics;
1174  proc reg data=out1.heart PLOTS(MAXPOINTS=NONE);
1175    model bmi = weight ageatstart height;
1176  title2 "PROC REG: SELECT Fit and Anova";
1177  run;
```




```
Output Added:
-------------
Name:       ANOVA
Label:      Analysis of Variance
Template:   Stat.REG.ANOVA
Path:       Reg.MODEL1.Fit.bmi.ANOVA
-------------

Output Added:
-------------
Name:       FitStatistics
Label:      Fit Statistics
Template:   Stat.REG.FitStatistics
Path:       Reg.MODEL1.Fit.bmi.FitStatistics
-------------
NOTE: The data set WORK.FITSTATISTICS has 3 observations and 8 variables.
NOTE: The data set WORK.ANOVA1 has 3 observations and 8 variables.
280  ods output close;
281  quit;
```

ODS EXCLUDE, SHOW

```
ods exclude ParameterEstimates;
ods show;

proc reg data=out1.heart PLOTS(MAXPOINTS=NONE);
  model bmi = weight ageatstart height;
  title2 "PROC REG: EXCLUDE parameters";
run;
quit;

ods trace off;
title2;
run;
```




```
703
704  ods exclude ParameterEstimates;
705  ods show;
Current OVERALL exclude list is:
1. ParameterEstimates
706
707  proc reg data=out1.heart PLOTS(MAXPOINTS=NONE);
708    model bmi = weight ageatstart height;
709    title2 "PROC REG: EXCLUDE parameters";
710  run;

Output Added:
-------------
Name:       NObs
Label:      Number of Observations
Template:   Stat.Reg.NObs
Path:       Reg.MODEL1.Fit.bmi.NObs
-------------

Output Added:
-------------
Name:       ANOVA
Label:      Analysis of Variance
Template:   Stat.REG.ANOVA
Path:       Reg.MODEL1.Fit.bmi.ANOVA
-------------

Output Added:
-------------
Name:       FitStatistics
Label:      Fit Statistics
Template:   Stat.REG.FitStatistics
Path:       Reg.MODEL1.Fit.bmi.FitStatistics
-------------

Output Added:
-------------
Name:       DiagnosticsPanel
Label:      Fit Diagnostics
Template:   Stat.REG.Graphics.DiagnosticsPanel
Path:       Reg.MODEL1.ObswiseStats.bmi.DiagnosticPlots.DiagnosticsPanel
-------------

Output Added:
-------------
Name:       ResidualPlot
Label:      Panel 1
Template:   Stat.REG.Graphics.ResidualPanel
Path:       Reg.MODEL1.ObswiseStats.bmi.ResidualPlots.ResidualPlot
-------------
711  quit;
```

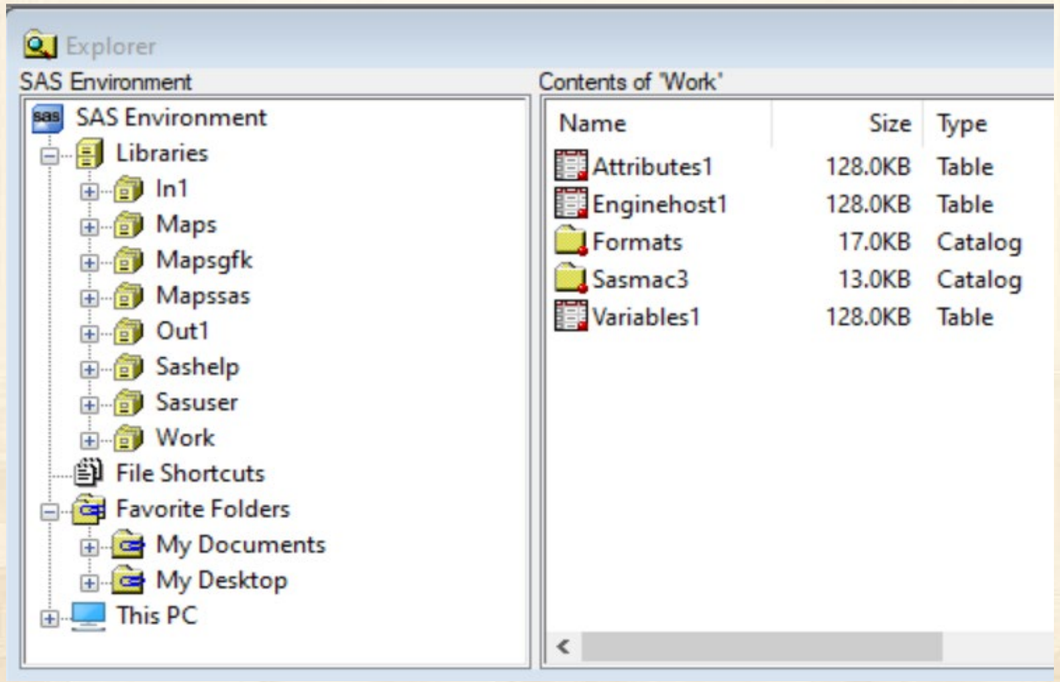
Harvesting your ODS Output Objects

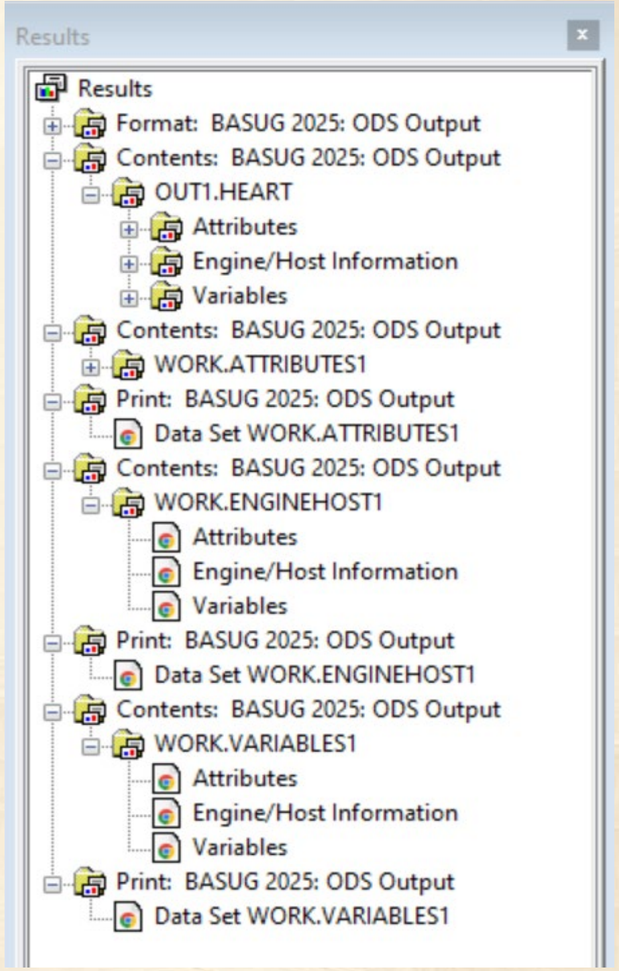
Harvesting ODS Output Objects

```
ods output
   attributes=attributes1
   enginehost=enginehost1
   variables=variables1;

proc contents data=out1.heart
   order=collate;
title2 "Collate contents with ODS OUTPUT
objects";
run;

ods output close;
```

Harvesting ODS Output Objects

What you see in the Results Window (ODS outputs) and SAS libraries (for example WORK) is NOT the same.





Harvesting ODS Output Objects

Contents

Alphabetic List of Variables and Attributes				
#	Variable	Type	Len	Format
2	Label1	Char	27	
1	Member	Char	256	
3	cValue1	Char	79	
4	nValue1	Num	8	D12.3

Test Print 5 Observations

Member	Label1	cValue1	nValue1
OUT1.HEART	Data Set Page Size	65536	65536
OUT1.HEART	Number of Data Set Pages	19	19.000000
OUT1.HEART	First Data Page	1	1.000000
OUT1.HEART	Max Obs per Page	282	282.000000
OUT1.HEART	Obs in First Data Page	265	265.000000

Harvesting ODS Output Objects

Contents

Alphabetic List of Variables and Attributes				
#	Variable	Type	Len	Format
2	Label1	Char	20	
5	Label2	Char	21	
1	Member	Char	256	
3	cValue1	Char	33	
6	cValue2	Char	4	
4	nValue1	Num	8	D12.3
7	nValue2	Num	8	D12.3

Test Print 5 Observations

Member	Label1	cValue1	nValue1	Label2	cValue2	nValue2
OUT1.HEART	Data Set Name	OUT1.HEART	.	Observations	5209	5209.000000
OUT1.HEART	Member Type	DATA	.	Variables	25	25.000000
OUT1.HEART	Engine	V9	.	Indexes	0	0
OUT1.HEART	Created	06/25/2025 09:11:47	2066461907	Observation Length	232	232.000000
OUT1.HEART	Last Modified	06/25/2025 09:11:47	2066461907	Deleted Observations	0	0

Harvesting ODS Output Objects

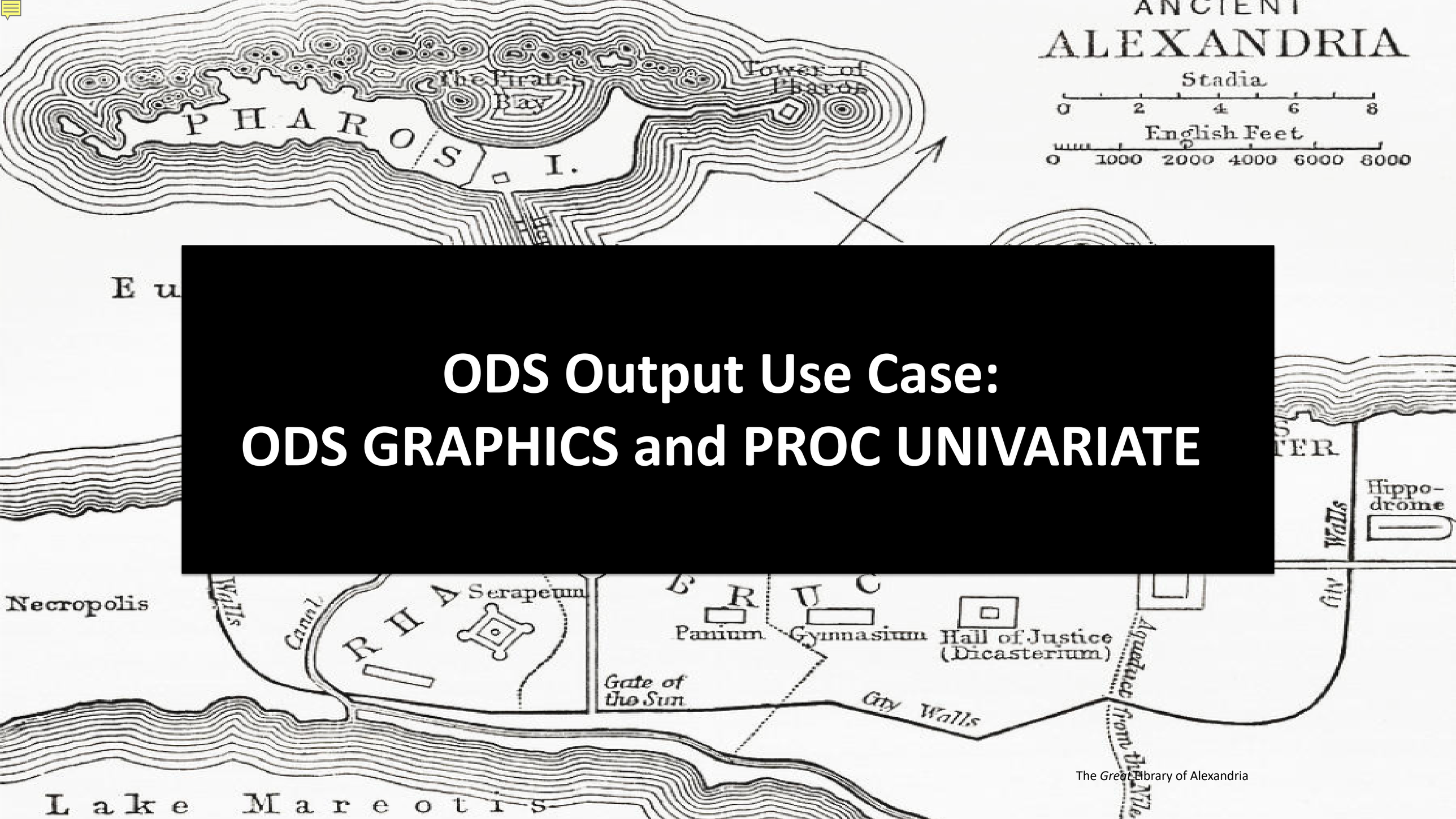
Contents

Alphabetic List of Variables and Attributes					
#	Variable	Type	Len	Format	Label
7	Label	Char	28		
5	Len	Num	8	3.	
1	Member	Char	256		
2	Num	Num	8	2.	#
6	Pos	Num	8		
4	Type	Char	4		
3	Variable	Char	32		

Test Print 5 Observations

Member	Num	Variable	Type	Len	Pos	Label
OUT1.HEART	12	AgeAtDeath	Num	8	64	Age at Death
OUT1.HEART	5	AgeAtStart	Num	8	8	Age at Start
OUT1.HEART	3	AgeCHDdiag	Num	8	0	Age CHD Diagnosed
OUT1.HEART	15	BP_Status	Char	7	191	Blood Pressure Status
OUT1.HEART	14	Chol_Status	Char	10	181	Cholesterol Status

ODS Output Use Case:
ODS GRAPHICS and PROC UNIVARIATE



The *Great* Library of Alexandria

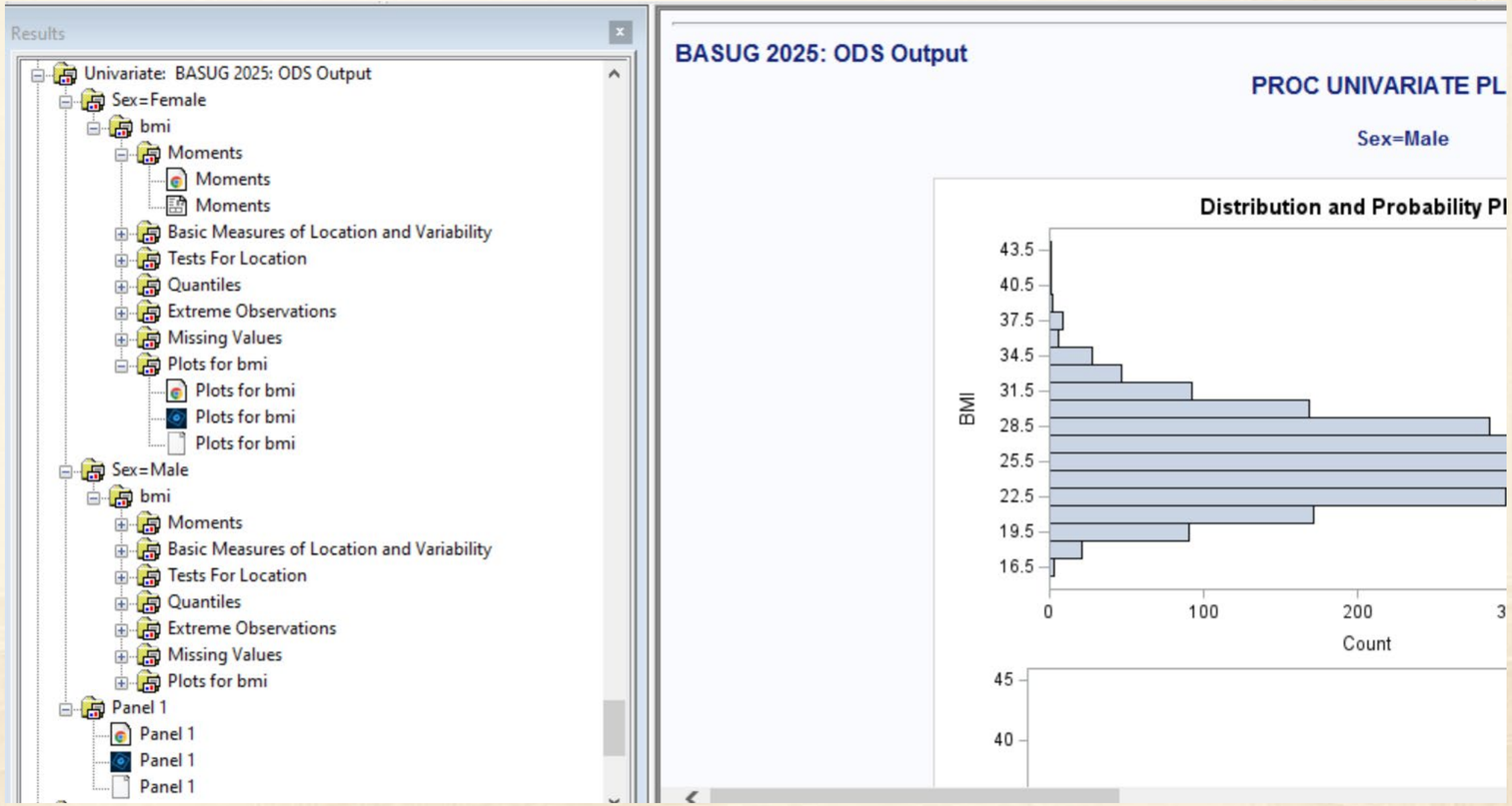
PROC UNIVARIATE ODS Output Objects

Plots are ODS Output Objects Too!

```
ods listing sge=on;
ods graphics on;
ods trace on;

proc univariate data=heartplots plot;
   by sex;
   var bmi;
title2 "PROC UNIVARIATE PLOTS";
run;
ods graphics off;

ods graphics on;
ods select Plots SSPlots;
proc univariate data=heartplots plot;
   by sex;
   var bmi;
title2 "PROC UNIVARIATE PLOTS";
run;
ods graphics off;
ods select all;
ods trace off;
```

PROC UNIVARIATE ODS Output Objects

Plots are ODS Output Objects Too!



PROC UNIVARIATE ODS Output Objects

Plots are ODS Output Objects Too!

```
Output Added:
-------------
Name:       Plots
Label:      Plots for bmi
Template:   base.univariate.Graphics.Plots
Path:       Univariate.ByGroup1.bmi.Plots
-------------
NOTE: The above message was for the following BY group:
      Sex=Female

Output Added:
-------------
Name:       Plots
Label:      Plots for bmi
Template:   base.univariate.Graphics.Plots
Path:       Univariate.ByGroup2.bmi.Plots
-------------
NOTE: The above message was for the following BY group:
      Sex=Male

Output Added:
-------------
Name:       SSPlots
Label:      Panel 1
Template:   base.univariate.Graphics.SSPlots
Path:       Univariate.SSPlots
-------------
NOTE: PROCEDURE UNIVARIATE used (Total process time):
      real time           2.64 seconds
      cpu time            1.09 seconds
```

ODS Output Use Case:
PROC SURVEYFREQ

The *Great* Library of Alexandria

PROC SURVEYFREQ ODS Output Objects

What a Difference an Option Makes

```
title2 "PROC SURVEYFREQ No Row Option";

proc surveyfreq data=out1.heart;
    tables sex*bmi_cat / cv deff chisq;
    weight sampleweight;
    format bmi_cat bmi_catf.;
run;

ods trace off;
```

```
title2 "PROC SURVEYFREQ Row Option";

proc surveyfreq data=out1.heart;
    tables sex*bmi_cat / row cv deff chisq;
    weight sampleweight;
    format bmi_cat bmi_catf.;
run;

ods trace off;
```

PROC SURVEYFREQ ODS Output Objects

What a Difference an Option Makes

```
Output Added:
-------------
Name:        Summary
Label:       Data Summary
Template:    Stat.SurveyFreq.Summary
Path:        Surveyfreq.Summary
-------------

Output Added:
-------------
Name:        CrossTabs
Label:       CrossTabulation Table
Template:    Stat.SurveyFreq.CrossTabFreqs
Path:        Surveyfreq.Table1.CrossTabs
-------------

Output Added:
-------------
Name:        ChiSq
Label:       Rao-Scott Chi-Square Test
Template:    Stat.SurveyFreq.Factoid
Path:        Surveyfreq.Table1.ChiSq
-------------
```

```
Output Added:
-------------
Name:        Summary
Label:       Data Summary
Template:    Stat.SurveyFreq.Summary
Path:        Surveyfreq.Summary
-------------

Output Added:
-------------
Name:        CrossTabs
Label:       CrossTabulation Table
Template:    Stat.SurveyFreq.CrossTabFreqs
Path:        Surveyfreq.Table1.CrossTabs
-------------

Output Added:
-------------
Name:        ChiSq
Label:       Rao-Scott Chi-Square Test
Template:    Stat.SurveyFreq.Factoid
Path:        Surveyfreq.Table1.ChiSq
-------------
```

PROC SURVEYFREQ ODS Output Objects

What a Difference an Option Makes

Alphabetic List of Variables and Attributes					
#	Variable	Type	Len	Format	Label
11	CV	Num	8	9.4	Coeff of Variation for Percent
12	DesignEffect	Num	8	8.4	Design Effect of Percent
2	F_Sex	Char	6		Sex
4	F_bmi_cat	Char	26		bmi_cat
6	Frequency	Num	8	BEST10.	
9	Percent	Num	8	8.4	
3	Sex	Char	6		
8	StdDev	Num	8	D10.	Standard Error of Wgt Freq
10	StdErr	Num	8	8.4	Standard Error of Percent
1	Table	Char	256		
7	WgtFreq	Num	8	D10.	Weighted Frequency
13	_SkipLine	Char	1		
5	bmi_cat	Num	8	BMI_CATF.	BMI Category

Alphabetic List of Variables and Attributes					
#	Variable	Type	Len	Format	Label
11	CV	Num	8	9.4	Coeff of Variation for Percent
12	DesignEffect	Num	8	8.4	Design Effect of Percent
2	F_Sex	Char	6		Sex
4	F_bmi_cat	Char	26		bmi_cat
6	Frequency	Num	8	BEST10.	
9	Percent	Num	8	8.4	
15	RowCV	Num	8	9.4	Coeff of Variation for Row Percent
13	RowPercent	Num	8	8.4	Row Percent
14	RowStdErr	Num	8	8.4	Standard Error of Row Percent
3	Sex	Char	6		
8	StdDev	Num	8	D10.	Standard Error of Wgt Freq
10	StdErr	Num	8	8.4	Standard Error of Percent
1	Table	Char	256		
7	WgtFreq	Num	8	D10.	Weighted Frequency
16	_SkipLine	Char	1		
5	bmi_cat	Num	8	BMI_CATF.	BMI Category

PROC SURVEYFREQ ODS Output Objects

BASUG 2025: ODS Output

SURVEYFREQ Output Objects

	Underweight					Healthy Weight					
Health Characteristics	**N**	**Wgted N**	**Std Dev**	**Std Err**	**Pct**	**N**	**Wgted N**	**Std Dev**	**Std Err**	**Pct**	**N**
Sex											
Female	65	89.5	11.24338	0.1492	1.1872861	1,471	2,127.6	48.24173	0.6359	28.224245	913
Male	14	20.5	5.56912	0.0739	0.2719482	985	1,434.8	42.14322	0.556	19.033722	1,057
Total	79	110	12.5189	0.1661	1.4592343	2,456	3,562.4	54.11798	0.7059	47.257966	1,970
Cause of Death											
Cancer	6	8.2	3.43687	0.1192	0.2844753	246	357.7	21.85727	0.7559	12.409367	209
Cerebral Vascular Disease	5	7.1	3.23572	0.1123	0.246314	136	195.8	16.56729	0.5743	6.7927147	158
Coronary Heart Disease	4	6.2	3.14414	0.1091	0.2150911	211	310.6	20.64339	0.7136	10.775369	259
Other	8	12.6	4.50447	0.1562	0.4371206	146	212.2	17.25033	0.5976	7.3616652	136
Unknown	6	8	3.31561	0.115	0.2775369	47	67.7	9.97647	0.346	2.3486557	39
Total	29	42.1	7.92138	0.2747	1.4605377	786	1,144.0	32.75692	1.1208	39.687771	801
Cholesterol Status											
Borderline	32	43.6	7.88135	0.1078	0.5960844	860	1,248.5	39.69124	0.5403	17.069069	729
Desirable	31	43.2	7.84745	0.1073	0.5906158	818	1,189.2	38.91188	0.5299	16.25834	404
High	13	18.5	5.19303	0.071	0.2529257	713	1,029.1	36.53789	0.4983	14.069507	778
Total	76	105.3	12.21813	0.1671	1.4396259	2,391	3,466.8	53.30823	0.7166	47.396916	1,911

PROC SURVEYFREQ ODS Output Objects

Write a macro to run PROC SURVEYFREQ on LHS variables by BMI category, outputting OOOS

Create LHS data set for row headers; do some formatting; split into 5 files (4 BMI categories and Total)

Second macro to format split files; merge 5 files to transpose bmi category and total column sets, output to ODS Excel and format

PROC SURVEYFREQ ODS Output Objects

f_tablevar	tablevar	Table	F_bmi_cat	bmi_cat	Frequency	WgtFreq	StdDev	Percent	StdErr	CV	DesignEffect
Heavy (16-25)	Heavy (16-25)	Table Smoking_Status * bmi_cat	Underweight (<18.5)	Underweight (<18.5)	18	22.90000	5.50039	0.3059	0.0735	0.2403	0.9146
Heavy (16-25)	Heavy (16-25)	Table Smoking_Status * bmi_cat	Healthy Weight (<18.5-<25)	Healthy Weight (<18.5-<25)	569	823.20000	33.26622	10.9980	0.4435	0.0403	1.0373
Heavy (16-25)	Heavy (16-25)	Table Smoking_Status * bmi_cat	Overweight (<25-<30)	Overweight (<25-<30)	375	543.30000	27.59432	7.2585	0.3681	0.0507	1.0391
Heavy (16-25)	Heavy (16-25)	Table Smoking_Status * bmi_cat	Obesity (30+)	Obesity (30+)	82	114.30000	12.77855	1.5271	0.1708	0.1118	1.0011
Heavy (16-25)	Heavy (16-25)	Table Smoking_Status * bmi_cat	Total		1044	1504	42.59925	20.0895	0.5673	0.0282	1.0347
Light (1-5)	Light (1-5)	Table Smoking_Status * bmi_cat	Underweight (<18.5)	Underweight (<18.5)	12	16.30000	4.76476	0.2178	0.0637	0.2924	0.9629
Light (1-5)	Light (1-5)	Table	Healthy	Healthy	307	451.10000	25.47081	6.0267	0.3396	0.0564	1.0513

PROC SURVEYFREQ ODS Output Objects

description	rowcat	rownum	nobs	chisqp	colno	f_freq	f_wgtfreq	f_stddev	f_stderr	f_percent
Female	1	1	5,209	<.0001	1	65	89.5	11.24338	0.1492	1.187
Female	1	2	5,209	<.0001	2	1,471	2,127.6	48.24173	0.6359	28.224
Female	1	3	5,209	<.0001	3	913	1,323.4	40.73756	0.5381	17.556
Female	1	4	5,209	<.0001	4	418	607.3	29.07358	0.3850	8.056
Female	1	5	5,209	<.0001	5	2,867	4,147.8	54.12022	0.7036	55.024
Male	1	6	5,209	<.0001	1	14	20.5	5.56912	0.0739	0.272
Male	1	7	5,209	<.0001	2	985	1,434.8	42.14322	0.5560	19.034
Male	1	8	5,209	<.0001	3	1,057	1,535.2	43.17190	0.5698	20.366
Male	1	9	5,209	<.0001	4	276	399.9	23.90230	0.3168	5.305
Male	1	10	5,209	<.0001	5	2,332	3,390.4	53.95474	0.7036	44.976
Total	1	11	5,209	<.0001	1	79	110.0	12.51890	0.1661	1.459
Total	1	12	5,209	<.0001	2	2,456	3,562.4	54.11798	0.7059	47.258

PROC SURVEYFREQ ODS Output Objects

description	rowcat	rownum	shadeit	nobs	chisqp1	colno	f_freq1	f_wgtfreq1	f_stddev1	f_stderr1	f_percent1	newrow
Sex	1	0	1									
Female	1	1		5,209	<.0001	1	65	89.5	11.24338	0.1492	1.18729	1
Male	1	6		5,209	<.0001	1	14	20.5	5.56912	0.0739	0.27195	2
Total	1	11		5,209	<.0001	1	79	110.0	12.51890	0.1661	1.45923	3
Cause of Death	2	0	1									
Cancer	2	1		5,209	0.0005	1	6	8.2	3.43687	0.1192	0.28448	1
Cerebral Vascular Disease	2	6		5,209	0.0005	1	5	7.1	3.23572	0.1123	0.24631	2
Coronary Heart Disease	2	11		5,209	0.0005	1	4	6.2	3.14414	0.1091	0.21509	3
Other	2	16		5,209	0.0005	1	8	12.6	4.50447	0.1562	0.43712	4
Unknown	2	21		5,209	0.0005	1	6	8.0	3.31561	0.1150	0.27754	5
Total	2	26		5,209	0.0005	1	29	42.1	7.92138	0.2747	1.46054	6
Cholesterol Status	3	0	1									
Borderline	3	1		5,209	<.0001	1	32	43.6	7.88135	0.1078	0.59608	1
Desirable	3	6		5,209	<.0001	1	31	43.2	7.84745	0.1073	0.59062	2
High	3	11		5,209	<.0001	1	13	18.5	5.19303	0.0710	0.25293	3

PROC SURVEYFREQ ODS Output Objects

Health Characteristics	N	Wgted N	Std Dev	Std Err	Pct	N	Wgted N	Std Dev	Std Err	Pct	N	Wgted N	Std Dev	Std Err	Pct	N	Wgted N
Sex																	
Female	65	89.5	11.24338	0.1492	1.18729	1,471	2,127.6	48.24173	0.6359	28.2242	913	1,323.4	40.73756	0.5381	17.5559	418	607.3
Male	14	20.5	5.56912	0.0739	0.27195	985	1,434.8	42.14322	0.5560	19.0337	1,057	1,535.2	43.17190	0.5698	20.3656	276	399.9
Total	79	110.0	12.51890	0.1661	1.45923	2,456	3,562.4	54.11798	0.7059	47.2580	1,970	2,858.6	52.36072	0.6862	37.9215	694	1,007.2
Cause of Death																	
Cancer	6	8.2	3.43687	0.1192	0.28448	246	357.7	21.85727	0.7559	12.4094	209	299.3	19.99050	0.6933	10.3833	76	111.4
Cerebral Vascular Disease	5	7.1	3.23572	0.1123	0.24631	136	195.8	16.56729	0.5743	6.7927	158	229.8	17.90320	0.6201	7.9722	79	116.7
Coronary Heart Disease	4	6.2	3.14414	0.1091	0.21509	211	310.6	20.64339	0.7136	10.7754	259	375.5	22.27446	0.7706	13.0269	129	185.3
Other	8	12.6	4.50447	0.1562	0.43712	146	212.2	17.25033	0.5976	7.3617	136	197.4	16.69671	0.5784	6.8482	64	95.0
Unknown	6	8.0	3.31561	0.1150	0.27754	47	67.7	9.97647	0.3460	2.3487	39	56.7	9.18543	0.3185	1.9670	20	29.3

PROC SURVEYFREQ ODS Output Objects

```
%macro odssf(rowcat=1,dv=sex);

ods output summary=summary&rowcat. crosstabs=crosstabs&rowcat. chisq=chisq&rowcat.;
proc surveyfreq data=outl.heart;
    tables &dv.*bmi_cat / row cv deff chisq;
    weight sampleweight;
    format bmi_cat bmi_catf.;
run;

ods output close;

data crosstabs&rowcat.a;
    length f_tablevar tablevar $ 32;
    set crosstabs&rowcat. (rename=(f_&dv=f_tablevar &dv=tablevar));
    rowcat=&rowcat.;
    rownum=_n_;
run;

data nobs&rowcat (keep=rowcat nobs);
    length nobs $ 10;
    set summary&rowcat (where=(labell="Number of Observations"));
    nobs =put(nvalue1,comma9.);
    rowcat=&rowcat.;
run;
```

PROC SURVEYFREQ ODS Output Objects

```
%IF %SYSFUNC(EXIST(chisq&rowcat.)) %then %do; /* if it exists, go ahead and make our day */
data rchisq&rowcat (keep=rowcat chisqp);
    length chisqp $ 8.;
    set chisq&rowcat. (where=(name1 = "P_RSCHI"));
    chisqp = cvalue1;
    rowcat=&rowcat.;
run;
%END;
%ELSE %DO; /* so it doesn't exist, we make it */
DATA rchisq&rowcat (keep=rowcat chisqp);
    length chisqp $ 8.;
    chisqp = "N/A";
    rowcat=&rowcat.;
run;
%END;

data rchisq&rowcat (keep=rowcat chisqp);
    length chisqp $ 8.;
    set chisq&rowcat. (where=(name1 = "P_RSCHI"));
    chisqp = cvalue1;
    rowcat=&rowcat.;
run;
```

PROC SURVEYFREQ ODS Output Objects

```
data anal&rowcat.;
    set crosstabs&rowcat.a;
    if _n_=1 then set nobs&rowcat.;
    if _n_=1 then set rchisq&rowcat.;
run;

proc print data=anal&rowcat. noobs;
run;

%mend;
```

```
%odssf(rowcat=1,dv=sex);
%odssf(rowcat=2,dv=DeathCause);
%odssf(rowcat=3,dv=Chol_status);
%odssf(rowcat=4,dv=bp_status);
%odssf(rowcat=5,dv=weight_status);
%odssf(rowcat=6,dv=Smoking_status);
```

PROC SURVEYFREQ ODS Output Objects

```
data biganal analcol1 analcol2 analcol3 analcol4 analcol5;
     length description $ 200;
     set anal1 anal2 anal3 anal4 anal5 anal6 ;

     colno=mod(rownum,5);
     if colno=0 then colno=5;
     if rownum ne 0 then description=f_tablevar;
     f_freq=put(frequency,commall.);
     f_wgtfreq=put(wgtfreq,commall.1);
     f_stddev=put(stddev,11.5);
     f_stderr=put(stderr,11.4);
     f_percent=percent;
     keep description f_freq f_wgtfreq f_percent f_stddev f_stderr chisqp nobs rowcat rownum colno;
     output biganal;

     if colno=1 then output analcol1;
     if colno=2 then output analcol2;
     if colno=3 then output analcol3;
     if colno=4 then output analcol4;
     if colno=5 then output analcol5;
 run;
```

PROC SURVEYFREQ ODS Output Objects

```
%macro splitem(col=1);

 proc sort data=analcol&col.;
     by rowcat rownum;
 run;

 data analcol&col.r (rename=(f_freq=f_freq&col
     f_wgtfreq=f_wgtfreq&col f_percent=f_percent&col
     f_stddev=f_stddev&col f_stderr=f_stderr&col chisqp=chisqp&col));
     set biganno analcol&col;
     by rowcat rownum;
     *reset rownum;
     if 1 le rownum le 5 then newrow=1;
     else if 6 le rownum le 10 then newrow=2;
     else if 11 le rownum le 15 then newrow=3;
     else if 16 le rownum le 20 then newrow=4;
     else if 21 le rownum le 25 then newrow=5;
     else if 26 le rownum le 30 then newrow=6;
     else if 31 le rownum le 35 then newrow=7;
     else if 35 le rownum le 40 then newrow=8;
     else if 41 le rownum le 45 then newrow=9;
     else if 45 le rownum le 50 then newrow=10;
     else if 51 le rownum le 55 then newrow=11;

 run;
```

PROC SURVEYFREQ ODS Output Objects

```
%splitem(col=5);

%let orderlist= description f_freq1 f_wgtfreq1 f_stddev1 f_stderr1 f_percent1
    f_freq2 f_wgtfreq2 f_stddev2 f_stderr2 f_percent2
    f_freq3 f_wgtfreq3 f_stddev3 f_stderr3 f_percent3
    f_freq4 f_wgtfreq4 f_stddev4 f_stderr4 f_percent4
    f_freq5 f_wgtfreq5 f_stddev5 f_stderr5 f_percent5
    nobs chisqp1 rowcat rownum newrow shadeit;
```

```
data report_sf (keep=&orderlist.);
    retain &orderlist;
    merge analcol1r analcol2r analcol3r analcol4r analcol5r;
    by rowcat newrow;
    *label variables;
    label
```

PROC SURVEYFREQ ODS Output Objects

```
ods listing close;

ods excel file="&indir.\reportreg.xlsx"
options(embedded_titles="yes" tab_color="purple"
frozen_rowheaders="1"
sheet_name="reportreg") style=styles.excel;
title1 j=l "BASUG 2025: ODS Output";
title2 j=l "SURVEYFREQ Output Objects" ;

proc report nowd data=report_reg /* spacing=8 */
    style(report)=[cellpadding=3pt vjust=b]
    style(header)=[just=center font_face="Helvetica" font_weight=bold font_size=8pt]
    style(lines)=[just=left font_face="Helvetica"] split='|';
  columns description
    ("Underweight" f_freq1 f_wgtfreq1 f_stddev1 f_stderr1 f_percent1)
    ("Healthy Weight" f_freq2 f_wgtfreq2 f_stddev2 f_stderr2 f_percent2)
    ("Overweight" f_freq3 f_wgtfreq3 f_stddev3 f_stderr3 f_percent3)
    ("Obesity" f_freq4 f_wgtfreq4 f_stddev4 f_stderr4 f_percent4)
    ("Total" f_freq5 f_wgtfreq5 f_stddev5 f_stderr5 f_percent5)
    chisqp1 shadeit;

  define shadeit / display ' ' noprint;
```

PROC SURVEYFREQ ODS Output Objects

```
  define f_percent5 / style(COLUMN)={just=c font_face="Helvetica" foreground=purple
           font_size=8pt cellwidth=100 }
                     style(HEADER)={just=c font_face="Helvetica" font_weight=bold foreground=purple
           font_size=8pt  };
  define chisqpl / style(COLUMN)={just=c font_face="Helvetica" foreground=purple
           font_size=8pt cellwidth=100 }
                     style(HEADER)={just=c font_face="Helvetica" font_weight=bold foreground=purple
           font_size=8pt  };
compute shadeit;
  if (shadeit eq 1) then call define(_row_,"STYLE","STYLE=[BACKGROUND=VPAB FONT_WEIGHT=BOLD
    FONT_SIZE=8pt FONTSTYLE=ITALIC]");
  endcomp;
run;

ods excel close;
quit;

ods listing;
```

PROC SURVEYFREQ ODS Output Objects

Embedded Titles

Spanning Headers

Non-Printing Variable to color rows

Define statement in PROC REPORT to Color Columns

BASUG 2025: ODS Output
SURVEYFREQ Output Objects

	Underweight					Healthy Weight					
Health Characteristics	**N**	**Wgted N**	**Std Dev**	**Std Err**	**Pct**	**N**	**Wgted N**	**Std Dev**	**Std Err**	**Pct**	**N**
Sex											
Female	65	89.5	11.24338	0.1492	1.1872861	1,471	2,127.6	48.24173	0.6359	28.224245	913
Male	14	20.5	5.56912	0.0739	0.2719482	985	1,434.8	42.14322	0.556	19.033722	1,057
Total	79	110	12.5189	0.1661	1.4592343	2,456	3,562.4	54.11798	0.7059	47.257966	1,970
Cause of Death											
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Cerebral Vascular Disease	5	7.1	3.23572	0.1123	0.246314	136	195.8	16.56729	0.5743	6.7927147	158
Coronary Heart Disease	4	6.2	3.14414	0.1091	0.2150911	211	310.6	20.64339	0.7136	10.775369	259
Other	8	12.6	4.50447	0.1562	0.4371206	146	212.2	17.25033	0.5976	7.3616652	136
Unknown	6	8	3.31561	0.115	0.2775369	47	67.7	9.97647	0.346	2.3486557	39
Total	29	42.1	7.92138	0.2747	1.4605377	786	1,144.0	32.75692	1.1208	39.687771	801
Cholesterol Status											
Borderline	32	43.6	7.88135	0.1078	0.5960844	860	1,248.5	39.69124	0.5403	17.069069	729
Desirable	31	43.2	7.84745	0.1073	0.5906158	818	1,189.2	38.91188	0.5299	16.25834	404
High	13	18.5	5.19303	0.071	0.2529257	713	1,029.1	36.53789	0.4983	14.069507	778
Total	76	105.3	12.21813	0.1671	1.4396259	2,391	3,466.8	53.30823	0.7166	47.396916	1,911

Conclusion

I hope you will agree that SAS ODS Output Objects offer many opportunities to enhance and customize your SAS reporting, along with saving valuable time. The basic concepts surrounding the use of ODS Output Objects remain the same whether you are doing a complex weighted multivariate analysis or a simple PROC FREQ. With ODS Output Objects, the sky is the limit!

Contact me:

saslouisehadden@gmail.com

Paper, Training Programs, and Presentation available

https://github.com/TheGirlWiththeSASTattoo

sas innovate 2026

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