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Essential SAS® ODS PDF

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ABSTRACT

This paper lists and demonstrates the ODS techniques that I have found most useful in creating user friendly PDF reports in SAS® 9.2 on a Windows operating system. Basic ODS techniques include creating PDF files (e.g. ODS PDF FILE= STYLE= KEYWORD= COLUMNS=), modifying page setup (e.g. orientation, date, title, and footnote), and saving procedural output to data sets (e.g. ODS OUTPUT). The examples also demonstrate simultaneously creating two PDF destinations (i.e. ODS PDF ID=) and selectively including or excluding procedural output to each destination (e.g. ODS PDF SELECT, EXCLUDE and WHERE=). Two PDF files are simultaneously created where PROC FREQ listings are directed to one file and selected PROC FREQ results are combined with PROC REPORT to create an executive summary in the other PDF file.

INTRODUCTION

The goal of this paper is to demonstrate the techniques I have used most frequently to produce nice looking PDF files containing output from SAS procedures. This paper is not an introduction to ODS, ODS PDF, or PROC REPORT. Featured capabilities are simultaneously creating more than one PDF file and including only selected parts of PROC FREQ results in one or the other files. For example, screen shots of two PDF files that were created simultaneously are shown in Figures 1 and 2. Several FREQ procedures were submitted that generated relatively standard output to the PDF shown in Figure 1 (only the first output is shown) while Figure 2 shows selected output displayed with PROC REPORT.

Figure 1 PDF file with PROC FREQ output

Creating ODS PDF with SELECT and EXCLUDE

Frequency Percent Row Pct Col Pct	Table of t1_1 by t2_1			
	t1_1(Caregiver Mental Health Need)	t2_1(Caregiver Mental Health Need)		
		No	Yes	Total
No	30 30.00 46.88 63.83	34 34.00 53.13 64.15	64 64.00	
Yes	17 17.00 47.22 36.17	19 19.00 52.78 35.85	36 36.00	
Total	47 47.00	53 53.00	100 100.00	

McNemar's Test	
Statistic (S)	5.6667
DF	1
Pr > S	0.0173

Figure 2 PDF file with PROC FREQ results Displayed with PROC REPORT

Creating ODS PDF with SELECT and EXCLUDE

Table 1 Caregiver Mental Health Need				
Responses	Time 1		Time 2	
	n	%	n	%
No	64	64.0	47	47.0
Yes	36	36.0	53	53.0
	100	100.0	100	100.0
Statistic (S)=5.6667 DF=1 Pr > S=0.0173				

Table 2 Caregiver Alcohol and Drug Service Need				
Responses	Time 1		Time 2	
	n	%	n	%
No	47	47.0	59	59.0
Yes	53	53.0	41	41.0
	100	100.0	100	100.0
Statistic (S)=3.4286 DF=1 Pr > S=0.0641				

The paper begins by demonstrating the most basic ODS PDF syntax and builds on that to finally demonstrate all the syntax necessary for producing the PDF files shown in Figures 1 and 2. The sections that follow discuss: (a) creating a PDF file, (b) styling titles and footnotes, (c) capturing results from procedures as data, (d) sending specific parts of a procedure's results to a destination, (e) simultaneously creating multiple PDF files, and (f) displaying the results with PROC REPORT.

CREATING A PDF FILE

The examples in this paper use the services data set created with the syntax shown in Figure 3. Figure 4 shows the basic syntax needed to create a PDF. The FILE= option is used to define its full path and name. Every PDF file in this paper is created with an initial ODS PDF FILE= line, followed by procedural syntax and a final ODS PDF CLOSE

Essential SAS® ODS PDF, continued

line. I will use the macro variable SASEXPORT to represent the full path to the location where the PDF file is created, for example, "c:\." The table created in the PDF file by ODS PDF and PROC FREQ is shown in Figure 4.

Figure 3 Services Data set

```
PROC FORMAT;
  VALUE yn 1 = 'Yes' 0 = 'No';
RUN;
DATA services ;
LABEL
t1_1 = 'Caregiver Mental Health Need'
t1_2 = 'Caregiver Alcohol and Drug Service
Need'
t1_3 = 'Medical Insurance Coverage'
t1_4 = 'Access to Routine Medical Care'
t1_5 = 'Last Medical Checkup'
t1_6 = 'Last Dental Checkup'
t2_1 = 'Caregiver Mental Health Need'
t2_2 = 'Caregiver Alcohol and Drug Service
Need'
t2_3 = 'Medical Insurance Coverage'
t2_4 = 'Access to Routine Medical Care'
t2_5 = 'Last Medical Check'
t2_6 = 'Last Dental Check';
FORMAT t1: t2: yn.;
ARRAY a t1_1- t1_6 t2_1- t2_6 ;
DO k = 1 TO 100;
DO OVER a;
  a = ROUND(RANUNI(9033905)) ;
END;
OUTPUT;
END;
RUN;
```

Figure 4 Creating a PDFfile using FILE=

```
%LET sasexport = c:\;
ODS PDF
FILE="&sasexport.example1.pdf";
PROC FREQ DATA=services;
TABLE t1_1;
RUN;
ODS PDF CLOSE;
```

The SAS System

The FREQ Procedure

Caregiver Mental Health Need				
t1_1	Frequency	Percent	Cumulative Frequency	Cumulative Percent
No	64	64.00	64	64.00
Yes	36	36.00	100	100.00

The following table shows some of the ODS PDF options that will be discussed in the in this section on creating a PDF file.

Table 1 Capability of Essential Options used on the ODS PDF Statement

Capability	Options
Alter the overall style of the PDF file, e.g. background color	STYLE =
Add metadata to the PDF file that may be viewed in the folder of a Windows OS	AUTHOR=, TITLE=, SUBJECT=, KEYWORDS=
Prevent procedures from creating a new page, if space allows. e.g. STARTPAGE=NEVER	STARTPAGE=
Allow procedural output to be placed in more than on column on a page	COLUMNS=
Allow more than one PDF file to be created at once	ID=
CONTENTS=yes creates a table of contents at the beginning of the PDF file	CONTENTS=

Essential SAS® ODS PDF, continued

ODS PDF STYLE=

Perhaps there is no greater evidence of the power of ODS PDF options than the use of STYLE= to change the entire look of the PDF file and the procedural output therein. Figure 5 shows the use of PROC TEMPLATE to list the styles that are available to use in the STYLE= option. The syntax produced a list of styles that appeared in the output window and I chose to use the OCEAN style. As shown in Figure 5, I added STYLE=OCEAN to the ODS PDF statement, and the background color, font type and size were changed from the default style.

The ability to customized a PDF using STYLE= may also be greatly expanded by creating your own style based on existing styles. In Figure 6, I create the style MYOCEAN from the OCEAN style, and replace some of the table style attributes in OCEAN with my own. Using PROC TEMPLATE to define styles and change attributes takes practice, but a little syntax goes a long way in making changes (see Gupta's and Haworth's paper in Recommended Reading).

Figure 5 Using STYLE= to Change the Over Look

```
PROC TEMPLATE;
  LIST STYLES;
RUN;

ODS PDF FILE="&sasexport.example2.pdf"
STYLE=OCEAN;
PROC FREQ DATA=services;
TABLE t1_1;
RUN;
ODS PDF CLOSE;
```

The SAS System

The FREQ Procedure

Caregiver Mental Health Need				
t1_1	Frequency	Percent	Cumulative Frequency	Cumulative Percent
No	64	64.00	64	64.00
Yes	36	36.00	100	100.00

Figure 6 Creating your own style

```
PROC TEMPLATE;
DEFINE STYLE myocean; PARENT=
styles.ocean;
REPLACE TABLE FROM OUTPUT /
FRAME = void
RULES = rows
CELLPADDING = 3pt
CELLSPACING = 0.0pt
BORDERWIDTH = 0.2pt;
END;
RUN;
```

```
ODS PDF FILE="&sasexport.example2a.pdf"
STYLE=myocean;
PROC FREQ DATA=services;
TABLE t1_1;
RUN;
ODS PDF CLOSE;
```

The SAS System

The FREQ Procedure

Caregiver Mental Health Need				
t1_1	Frequency	Percent	Cumulative Frequency	Cumulative Percent
No	64	64.00	64	64.00
Yes	36	36.00	100	100.00

ODS PDF KEYWORDS=

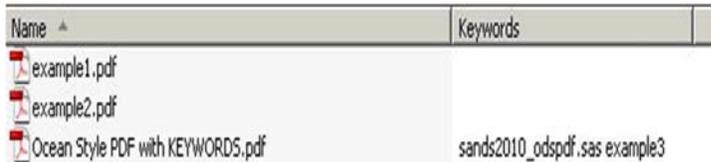
Several options are available to add metadata to your PDF. One value of adding metadata is the ability to have a nice descriptive name for your files while also being able to organize your files on other dimensions, such as the name of the program that created your file, the person that requested the file, the reason for the file (e.g. quarterly report), or the phase of the project when the file was generated (e.g. follow-up).

Essential SAS® ODS PDF, continued

Figure 7 shows the KEYWORDS column in my Windows folder. In this example, I've given a descriptive name to the PDF file "Ocean Style PDF with KEYWORDS" and you can see that the keywords column shows the name of the program that created the file and the descriptor "example3." The syntax in Figure 7 was used to add the metadata using the KEYWORDS option in ODS PDF line. I obtained the name of the program from an environmental variable SAS_EXECFILENAME which is available in the enhanced editor. %SYSGET assigned the name of the program to the macro variable PROGRAMNAME.

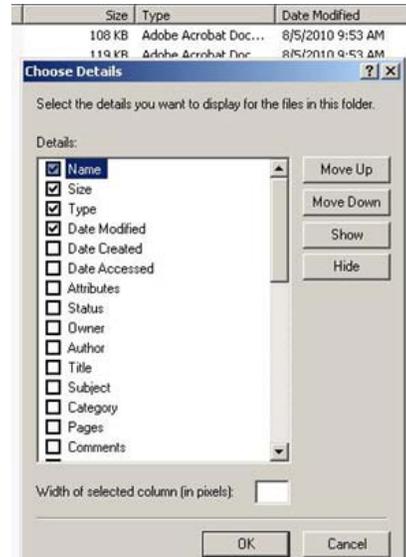
Figure 8 shows the last step you need to take just once to use the metadata. I changed the default columns in my Windows folder to add the keywords column. I selected VIEW, CHOOSE DETAILS from the folder menu to obtain the dialog in Figure 8 and then clicked on keywords.

Figure 7 Windows Folder with Keywords as a Column



```
%LET programname = %SYSGET(SAS_EXECFILENAME);
%LET mytitle = Ocean Style PDF with KEYWORDS;
ODS PDF FILE="&sasexport.&mytitle..pdf"
STYLE=OCEAN KEYWORDS="&programname example3";
PROC FREQ DATA=services;
TABLE t1_1;
RUN;
ODS PDF CLOSE;
```

Figure 8 Adding Keywords Column to Windows Folder



CONSOLIDATION OF A PDF FILE WITH VARIOUS OPTIONS

By default PROC FREQ does not maximize the use of space in the PDF output file. Figure 9 shows PROC FREQ with the AGREE option and pseudo code representing the submission of three additional FREQ procedures. Each PROC FREQ took one page for the cross-tabulation results (e.g. Figure 10) and one page for the McNemar's and Kappa results (e.g. Figure 11). I ran four PROC FREQs and produced an 8 page PDF, the first page is shown in Figure 10 and eighth page in Figure 11.

Figure 9 Four PROC FREQ Results to PDF

```
ODS PDF
FILE="&sasexport.example4.pdf"
STYLE=OCEAN;
PROC FREQ DATA=services;
TABLE t1_1 * t2_1/AGREE;
RUN;
[repeat PROC FREQ for 3 more
variable pairs]
ODS PDF CLOSE;
```

Figure 10 Page One of Eight Pages of PROC FREQ

The SAS System

The FREQ Procedure

Frequency Percent Row Pct Col Pct		Table of t1_1 by t2_1		
		t1_1(Caregiver Mental Health Need)	t2_1(Caregiver Mental Health Need)	
		No	Yes	Total
No		30 30.00 46.88 63.83	34 34.00 53.13 64.15	64 64.00
Yes		17 17.00 47.22 36.17	19 19.00 52.78 35.85	36 36.00
Total		47 47.00	53 53.00	100 100.00

Figure 11 Page Eight of PROC FREQ Output

The SAS System

The FREQ Procedure

Statistics for Table of t1_4 by t2_4

McNemar's Test	
Statistic (S)	0.1765
DF	1
Pr > S	0.6744

Simple Kappa Coefficient	
Kappa	-0.0316
ASE	0.0997
95% Lower Conf Limit	-0.2269
95% Upper Conf Limit	0.1638

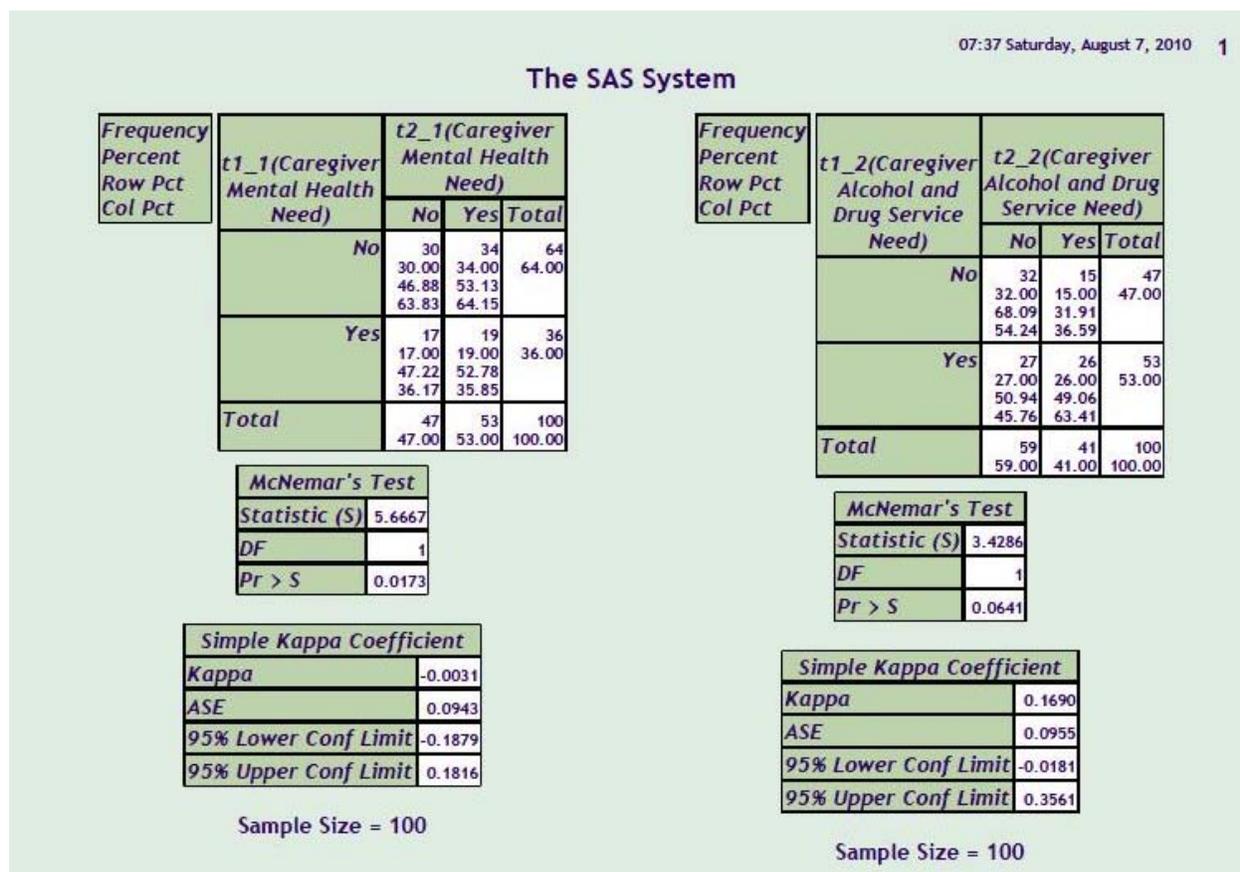
Sample Size = 100

Essential SAS® ODS PDF, continued

With just a few options I was able to produce the same output in just 2 pages rather than 8. Figure 12 shows two PROC FREQs and the resulting output on a single page. The COLUMNS=2 option was used to allow the PROC FREQ results to be written side-by-side; however, the output was too long for the page, so I used the general ODS option NOPROCTITLE to remove the default title "The Frequency Procedure." The PROC FREQ option NOTITLE was used to remove the title above the McNemar's table, "Statistics for Table of..."

Figure 12 Using Options COLUMNS=, NOPROCTITLE, and NOTITLE

```
ODS PDF FILE="sasexport.example4b.pdf" STYLE=OCEAN COLUMNS=2;
ODS NOPROCTITLE;
PROC FREQ DATA=services NOTITLE;
TABLE t1_1 * t2_1/AGREE;
RUN;
PROC FREQ DATA=services NOTITLE;
TABLE t1_2 * t2_2/AGREE;
RU
ODS PDF CLOSE;
```



By default, PROC FREQ creates a new page in ODS PDF, and in many cases ODS PDF STARTPAGE= NEVER is very useful in allowing more than one procedure output to appear on a page. It was not needed in this example because when COLUMNS=2 is set the page break created by the procedure causes the next procedure output to go into the next column. If there had been room for more than one procedure output per column, then ODS PDF STARTPAGE=NEVER would have been useful.

Essential SAS® ODS PDF, continued

STYLING TITLES AND FOOTNOTES

Table 2 shows several options and style attributes that I have found essential for placing and styling the titles and footnotes in PDF files.

Table 2 Capability of Essential OTIONS and Style Attributes

Capability	Options/Style Attributes
System options may be used to remove the default SAS date and page number, and to make the page PORTRAIT or LANDSCAPE.	NODATE, NONUMBER, ORIENTATION=
An option of ODS that is instrumental in obtaining the page number from Acrobat. Defines a character that tells ODS to treat the text to follow the character as an Acrobat command.	ODS ESCAPECHAR=
Style attributes that may be used in TITLE and FOOTNOTE statements	HEIGHT=, J=, F=

Figure 13 shows syntax using the options and style attributes along with a small macro program I used to generate a formatted time and date. Figure 14 shows the title and footnotes created in the PDF file.

Figure 13 Using Options and Style Attributes to modify titles and footnotes

```

OPTIONS ORIENTATION=LANDSCAPE NODATE NONUMBER;
TITLE1 HEIGHT=12PT J=LEFT F=ARIAL "Modifying OPTIONS";
%macro repnow ;
  %local d t ;
  %let d = %sysfunc( date( ), weekdate29 );
  %let t = %sysfunc( time( ), timeampm8 );
  &t &d
%mend repnow;
%let ff = HEIGHT=8PT J=RIGHT F=ARIAL;
FOOTNOTE1 &ff "Page ^{thispage} of ^{lastpage}";
FOOTNOTE2 &ff "%repnow";

ODS PDF FILE="&sasexport.example5.pdf" STYLE=OCEAN;
ODS ESCAPECHAR='^'; ODS NOPROCTITLE;
PROC FREQ DATA=services NOTITLE;
TABLE t1_1 * t2_1/AGREE;
RUN;
ODS PDF CLOSE;
    
```

Figure 14 Example PDF with Custom TITLE and FOOTNOTE

The screenshot shows a PDF report with a title 'Modifying OPTIONS' and a contingency table. The table has columns for 't1_1(Caregiver Mental Health Need)' and 't2_1(Caregiver Mental Health Need)'. The 't2_1' column is further divided into 'No', 'Yes', and 'Total'. The 't1_1' column is divided into 'No' and 'Yes'. The table includes counts, percentages, and row percentages. Below the table is a section for 'McNemar's Test' with a statistic value of 5.447. The footer of the page reads 'Page 1 of 1' and '10:57 AM Saturday, August 7, 2010'.

Frequency Percent Row Pct Col Pct	t1_1(Caregiver Mental Health Need)	t2_1(Caregiver Mental Health Need)		
		No	Yes	Total
	No	30 30.00 46.88 63.83	34 34.00 53.13 64.15	64 64.00
	Yes	17 17.00 47.22 36.17	19 19.00 52.78 35.85	36 36.00
	Total	47 47.00	53 53.00	100 100.00

McNemar's Test
Statistic (Chi-Square) = 5.447

Page 1 of 1
10:57 AM Saturday, August 7, 2010

Essential SAS® ODS PDF, continued

CAPTURING RESULTS FROM PROCEDURES AS DATA

It is necessary to know the names of the objects that procedures make available to ODS in order to use the object to save the results of the procedure to a data set. Knowing the names of the objects also allows the capability of saving specific parts of a procedure's output to a PDF while excluding others (e.g. ODS PDF SELECT WHERE). We will cover this in the next section. Here we will determine the names of the PROC FREQ objects in our example that are available to ODS and save those results to data sets.

The names of the objects may be obtained with the use of ODS TRACE. In this example, prior to creating a PDF file, I submitted the following:

```
ODS TRACE ON;
PROC FREQ DATA=services;
TABLE t1_1 * t2_1;
RUN;
ODS TRACE OFF;
```

In addition to creating PROC FREQ output in the list window, the following was written to the log:

```
Name:      CrossTabFreqs
Label:     Cross-Tabular Freq Table
Template:  Base.Freq.CrossTabFreqs
Path:     Freq.Table1.CrossTabFreqs
```

The name of the object available to ODS is CROSSTABFREQS. It is important to note that not only do other procedures make available different objects, but depending on a procedure's statements and options objects may or may not be available. As a result, it is important to use ODS TRACE with the exact procedural syntax that you intend to use. For example, when I used ODS TRACE with PROC FREQ and the AGREE option on the TABLE statement, I obtained the names of two additional objects MCNEMARSTEST and SIMPLEKAPPA. The three objects of CROSSTABFREQS, MCNEMARSTEST, and SIMPLEKAPPA correspond to the 3 tables shown earlier in Figure 12.

I submitted the following syntax in order to save the results of two of the objects, CROSSTABFREQS and MCNEMARSTEST, to data sets. The object names are shown on the left of the equal signs in the ODS OUTPUT statement. I chose to name the data sets, on the right of the equal signs, with the same names:

```
ODS OUTPUT CROSSTABFREQS= CrossTabFreqs MCNEMARSTEST = McNemarsTest;
PROC FREQ DATA=services;
TABLE t1_1 * t2_1/AGREE;
RUN;
ODS OUTPUT CLOSE;
```

This syntax does not create a PDF; however, saving the results of an object to a data set may be done in order to later display the results in a PDF. Or as in later examples, it may be done during the actual creation of a PDF in order to immediately present the results with another procedure, such as PROC REPORT. In either case, the selected inclusion or exclusion of results is powerful. The next section shows the use of ODS PDF SELECT in order to further extent this capability.

SENDING SPECIFIC PARTS OF PROCEDURE OUTPUT TO A PDF FILE

In addition to ODS OUTPUT as a means of capturing and selectively presenting results from procedures, the ODS PDF SELECT/EXCLUDE and WHERE options allow selected procedural output to be sent to or excluded from a PDF file. The following syntax uses the name of the CROSSTABFREQS object in an ODS SELECT statement to cause only the first table produced by the PROC FREQ to be sent to the PDF file:

```
ODS PDF FILE="&sasexport.Example 6.pdf" ...;
ODS PDF SELECT WHERE=( _NAME_ in ('CrossTabFreqs') );
PROC FREQ DATA=services;
TABLE t1_1 * t2_1/AGREE;
RUN;
ODS PDF CLOSE;
```

All three tables, cross tabulation, McNemar's and Simple Kappa results were sent to the list output; however, only the cross tabulation was sent to the PDF file due to the selection of the CROSSTABFREQS object in the ODS PDF SELECT statement.

Essential SAS® ODS PDF, continued

SIMULTANEOUSLY CREATING TWO PDF FILES AND SELECTIVELY SENDING RESULTS

The use of the ID= option further extends the capability of selecting and excluding results by allowing 2 or more PDF files to be created simultaneously. In the following example, the PROC FREQ results are used in both PDF files, but the file identified as ID=LONG contains all the results from the PROC FREQ while the PDF identified as ID=SHORT does not contain the Simple Kappa table.

```
ODS PDF (ID=long) FILE="%sasexport.Example 7a.pdf";
ODS PDF (ID=short) FILE="%sasexport.Example 7b.pdf" STYLE=OCEAN;
ODS PDF (ID=short) EXCLUDE WHERE=( _name_ in ('SimpleKappa') );
PROC FREQ DATA=services NOTITLE;
TABLE t1_1 * t2_1/AGREE;
RUN;
ODS PDF (ID=short) CLOSE;
ODS PDF (ID=long) CLOSE;
```

The names of ID= are of your choosing. All the ODS PDF options are applied separately for each PDF file, so for example, I chose to format the SHORT PDF with STYLE=OCEAN, while leaving the LONG PDF with default style. It is necessary to close both PDF destinations.

It may also be useful to create two PDF files at once, selectively including or excluding results, while also saving the results using ODS OUTPUT in order to display those results with a nicer way using PROC REPORT. The following syntax combines all three techniques of ID=, SELECT/EXCLUDE WHERE, and OUTPUT. I have inserted pseudo code "[Insert ...]" to indicate that syntax including PROC REPORT would be used to present the results of the PROC FREQ. The results found in the data sets CROSSTABFREQS and MCNEMARSTEST:

```
ODS PDF (ID=lis) FILE="%sasexport.Example 8a.pdf" ;
ODS PDF (ID=nice) FILE="%sasexport.Example 8b.pdf" STYLE=OCEAN;
ODS PDF (ID=nice) EXCLUDE _ALL_;
ODS OUTPUT CROSSTABFREQS= CrossTabFreqs (rename=(t1_1=var1 t2_1=var2))
MCNEMARSTEST = McNemarsTest;
PROC FREQ DATA=services;
TABLE t1_1 * t2_1/AGREE;
RUN;
ODS OUTPUT CLOSE;
ODS PDF (ID=lis) EXCLUDE _ALL_;
ODS PDF (ID=nice) SELECT WHERE=( _NAME_ in ('Report') );
[Insert DATA step, PROC SQL, and PROC REPORT syntax to follow]
ODS PDF (ID=lis) CLOSE;
ODS PDF (ID=nice) CLOSE;
```

The LIS and NICE PDF files are started on the first two lines. NICE is formatted with OCEAN style. The third line immediately excludes all output from NICE. This will stay in effect until it is changed. As a result of the EXCLUDE, the PROC FREQ output will not go to NICE, but it will go to the LIS PDF. The ODS OUTPUT statement is used to create the CROSSTABFREQS and MCNEMARSTEST data sets that store the results from the PROC FREQ. Following the PROC FREQ and the ODS OUTPUT CLOSE statement, all output is excluded from LIS using the statement: ODS PDF (ID=lis) EXCLUDE _ALL_; LIS has its output already. NICE PDF will receive its output via PROC REPORT using the results in CROSSTABFREQS and MCNEMARSTEST.

In order to maximally consolidate the results, I elected to report the McNemar's results as a line under my PROC REPORT table. Figure 15 shows that the MCNEMARS data set has 3 observations. I wanted to list the value of LABEL1 and CVALUE1 as for example: Statistic (S)=5.6667 DF=1 Pr > S=0.0173.

Figure 15 The MCNEMARS data set

Table	Name1	Label1	cValue1	nValue1
Table t1_1 * t2_1	MCNEM	Statistic (S)	5.6667	5.666667
Table t1_1 * t2_1	DF_MCNEM	DF	1	1.000000
Table t1_1 * t2_1	P_MCNEM	Pr > S	0.0173	0.017290

Essential SAS® ODS PDF, continued

In order to capture the McNemar's test results I used following PROC SQL syntax to save the values of LABEL1 and CVALUE1 to a macro variable called MC. The CATX function placed an "=" sign between the values of the variables and the key phrase SEPARATED BY "" caused the values of the variables from all three observations of MCNEMARS to be saved to the MC macro variable. The line %PUT &MC resolved the macro variable to the log where I reviewed its contents as: Statistic (S)=5.6667 DF=1 Pr > S=0.0173 .

```
PROC SQL NOPRINT;
SELECT CATX('=',label1,cvalue1) into : mc SEPARATED BY ' ' FROM McNemarsTest;
QUIT;
%PUT &mc;
```

Since the McNemar's test compares the marginal percent in Figure 16 at time 1 (e.g. 36% Yes) to that at time 2 (e.g.53% Yes), I used a DATA step to extract only the marginal results from CROSSTABFREQS.

```
DATA CrossTabFreqs;
SET CrossTabFreqs;
IF var1 = . THEN onevalue = var2;
ELSE IF var2 = . THEN onevalue = var1;
IF (_type_ = '01' AND var1 =.) OR
(_type_ = '10' AND var2 =. );
RUN;
```

Figure 17 shows the CROSSTABFREQS after the DATA step.

Figure 17 PROC PRINT of CROSSTABFREQS with only Marginal N and Percent

onevalue	var1	var2	_TYPE_	Frequency	Percent
0	No	.	10	64	64
1	Yes	.	10	36	36
0	.	No	01	47	47
1	.	Yes	01	53	53

In addition to keeping only the marginal results (Figure 17), I also created the variable ONVALUE. Since the marginal results for each variable are on different rows, my plan was to use PROC REPORT to create just 2 rows of results rather than four. The following PROC REPORT syntax shows that I did this by defining ONEVALUE as a GROUP variable and _TYPE_ as an ACROSS variable. This strategy created 2 rows, one Yes and one NO, and a frequency and a percent column for _TYPE_ =10 and for _TYPE_ =01. The value 10 for type identified the time 1 results and 01 identified the time 2 results, so I created the format \$TIMETYPE. I also applied the YN format used for the original variables to ONEVALUE. The macro variable MC was resolved in the LINE statement within the AFTER _PAGE_ compute block in order to show the results of the McNemar's test at the bottom of the table.

```
PROC FORMAT;
VALUE $timetype '10'='Time 1' '01'='Time 2';
RUN;
PROC REPORT DATA=CrossTabFreqs nowd MISSING;
COL ("Table 1 Caregiver Mental Health Need" onevalue (_TYPE_), (frequency
percent));
DEFINE onevalue /GROUP 'Responses' STYLE=[CELLWIDTH=200] CENTER;
DEFINE _TYPE_ /ACROSS FORMAT=$timetype. "";
DEFINE FREQUENCY/ 'n' STYLE=[CELLWIDTH=70];
DEFINE PERCENT/'%' STYLE=[CELLWIDTH=70] FORMAT=5.1;
RBREAK AFTER / OL SKIP SUMMARIZE SUPPRESS;
COMPUTE AFTER _PAGE_ /;
LINE "&mc";
ENDCOMP;
FORMAT onevalue yn.;
RUN;
```

I used a couple techniques that are particularly nice when placing many PROC REPORT output on a single page. First, it is very useful to assign the table title in the COL statement because the title will always stay with the REPORT table. STYLE=[CELLWIDTH=] is also very useful because it can be used to make all the columns of all the tables on a page a constant width.

Figure 16 Identifying the Marginal n and Percent

Frequency Percent Row Pct Col Pct	t1_1(Caregiver Mental Health Need)	t2_1(Caregiver Mental Health Need)		Total
		No	Yes	
	No	30 30.00 46.88 63.83	34 34.00 53.13 64.19	64
	Yes	17 17.00 47.22 36.17	19 19.00 52.78 35.85	36
	Total	47 47.00	53 53.00	100 100.00

McNemar's Test	
Statistic (S)	5.6667
DF	1
Pr > S	0.0173

Essential SAS® ODS PDF, continued

CONCLUSION

This paper reviewed basic ODS techniques for creating PDF files (e.g. ODS PDF FILE= STYLE= KEYWORD= COLUMNS=), modifying page setup (e.g. orientation, date, title, and footnote), and saving procedural output to a data set (e.g. ODS OUTPUT). It also demonstrated simultaneously creating two PDF destinations (i.e. ODS PDF ID=) and selectively including or excluding procedural output to each destination (e.g. ODS PDF SELECT, EXCLUDE and WHERE=).

RECOMMENDED READING

- Bessler, L. (2005). Getting started with, and getting the most out of, SAS ODS PDF: No mastery of PROC TEMPLATE required. SAS Conference Proceedings: Technical Solutions, Phuse, Heidelberg, Germany.
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