PRACTICAL APPLICATIONS OF PROC PRINTTO

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ABSTRACT

By using Proc Printto, output from SAS procs can be manipulated to meet the needs and/or desires of the user. Simple programs are presented for creating concise summaries of analyses by reducing and enhancing output.

INTRODUCTION

SAS contains many useful statistical procedures. One of the few drawbacks is that the output frequently is cumbersome and hard to control. Proc Printto makes it possible to read the output so it can be treated like any other SAS data set. This means that the user can control what is printed. Reducing or reordering output has received many votes on the SAS balloting, and the macros depict methods for achieving these goals.

The following examples are presented:

1 - suppressing the carriage control
2 - reordering the output
3 - enhancing the output
4 - compressing the output
5 - rerouting the output.

The following data set and macros are used in all examples. The macros used for reading the carriage control (INCC), reading the output line (INL), printing the line (PUTL) and reading the by variable (INBV) are listed below. The data set used in all examples has variables Y and X (dependent variable and covariate), 3 treatments, 5 blocks and 3 levels of the by variable (BYVAR).

```
DATA DATA;DO BYVAR=1 TO 3;DO TRT=1 TO 3;
   DO BLK=1 TO 5; DO REP=1 TO 20;
   X=NORMAL(0); Y=X*5+NORMAL(0); OUTPUT;
   END; END; END; END;

MACRO DSNIN
   DATA DSN;INFILE FT20F001 LENGTH=L; %
MACRO PPT PROC PRINTTO %
MACRO PPTN PPT UNIT=20 NEW %
MACRO INCC INPUT @1 CC $CHAR1. @ %
MACRO INL L=L-1;
   INPUT @2 LINE $VARYING64. L %
MACRO PUTL PUT LINE $CHAR64. %
MACRO INBV RETAIN BYVAR;
   IF CC='1' THEN INPUT #3 @2 BYVAR= @ %
```

1. SUPPRESSING THE CARRIAGE CONTROL

Some heavily used procs have a rather low lines per page ratio. For example, Proc GLM with a one way analysis of covariance and lsmeans will print less than 50 lines of output on 3 pages. Since the page size is usually about 60, the output will fit on one page. The code in example 1 takes the output from each GLM and prints the result on one page for each level of the by variable. Figure 1 displays the result.

A sensible addition to the program would be to count the number of lines per page (from a Proc) and print a new page only when there is not enough room (determined from the linesleft option on a print file). This is a useful way for handling procs such as Proc Freq, where the number of lines printed varies from a few to many, and the page breaks are unimportant. Figure 2 displays the results from a program similar to example #1.

2. REORDERING THE OUTPUT

Reading SAS generated output with Proc Printto as above and locating and reading the by variable which produced the page, the output can be sorted before printing, giving the effect of a global by statement.

The code in example 2 produces GLM output on one page followed by a page of standard Univariate output.

3. ENHANCING THE OUTPUT

By reading the output as before and merging a data set with user generated statistics, it it possible to make useful additions to SAS procs. Example 3 consists of Proc Univariate output with trimmed means added to each page.

Figure 3 contains output from this program. Similar programs which have proved useful add outlier tests or Winzorized statistics to each Univariate output, tests of assumptions and pairwise comparisons (other than those available) to GLM, or exact RxC contingency tables to Freq.

4. COMPRESSING THE OUTPUT

SAS output can usually be printed on 64 character lines without increasing the number of pages printed. The method is similar to that described in example #2, but merging rather than interleaving the the output. The resulting data set contains one analysis on each side of the page. Figures 4, 4a and 5 display this technique. Figure 6 contains ten pages of Freq output, produced by a similar program. Example 4 contains the source code for Figure 5.

Examples of this side-by-side output that have proved particularly useful are

GLM next to a print of cell means
GLM " " " plot " " "
GLM " " " GLM of transformed data
GLM " " " Univariate on residuals
Freq " " " Freq

Taking this one step further, one can design programs to take selected lines or pages from SAS procs and print them as you wish. The following example contains the essential output from 6 GLM's (an analysis of variance with lsmeans, test of homogeniety of slopes and an analysis of covariance with lsmeans, for one and two way models). The reduction in output is considerable, from fourteen pages to one page.

5. RE-ROUTING THE OUTPUT

Output from SAS can be sent to other devices, for example a plotter (useful for making slides). Example 5 contains code to read the output from GLM and write TELAGRAF commands, which are executed through Proc Tag and the Run statement.

REFERENCES

Barr, A.J., Goodnight, J.H., Sall,J.P., and Helwig, J.T. 1979 SAS User's Guide. SAS Institute Inc., Cary, North Carolina

AUI Data Graphics. The SAS/TELAGRAF INTERFACE, AUI Data Graphics, Washington, D.C.


```
* EXAMPLE #1 - SUPPRESSING THE          *;
*              CARRIAGE CONTROL          *;
PPTN; PROC GLM; BY BYVAR; CLASS TRT;     *;
      MODEL Y=X TRT / SS2;
      LSMEANS TRT/PDIFF; PPT;
MACRO DSN _NULL_ %
DSNIN; FILE PRINT; INCC; INL;
IF CC='1' THEN DO; PG+1;
  IF MOD(PG,3)=1 THEN PUT _PAGE_; END;
IF MOD(PG,3)^=1 THEN PUTL;
```

```
* - EXAMPLE #2 - REORDERING OUTPUT      *;

PPTN; PROC GLM; BY BYVAR; CLASS TRT;
      MODEL Y=X TRT / SS2;
      LSMEANS TRT / PDIFF;
      OUTPUT OUT=R RESIDUAL=R; PPT;
MACRO DSN DS1 % DSNIN; INCC; INBV;
RETAIN BYVAR; INL; DS=1;
PPTN; PROC UNIVARIATE DATA=R; BY BYVAR;
      VAR R; ID REP; PPT;
MACRO DSN DS2 % DSNIN; INCC; INBV;
RETAIN BYVAR; INL; DS=2;
DATA _NULL_; FILE PRINT;
SET DS1 DS2; BY BYVAR DS;
IF FIRST.DS THEN PUT _PAGE_; PUTL;
```

```
* EXAMPLE #3 - ENHANCING OUTPUT -       *;

PPTN; PROC UNIVARIATE; BY BYVAR;
      VAR Y; ID REP; OUTPUT
      OUT=N(KEEP=BYVAR N) N=N; PPT;
MACRO DSN OP % DSNIN; INCC; INBV; INL;
DATA DATA; MERGE DATA N; BY BYVAR;
   ARRAY S(J) S1-S5; IF FIRST.BYVAR
   THEN I=0; I+1; DO J=1 TO 5;
   IF NOT(N*(J-1)/40<I<=N*(41-J)/40)
   THEN S=.; ELSE S=Y; END;
PROC MEANS NOPRINT DATA=DATA; BY BYVAR;
   VAR S1-S5; OUTPUT OUT=TRIM
   N=N1-N5 MEAN=M1-M5 STD=S1-S5;
DATA _NULL_; FILE PRINT LL=LL;
MERGE OP TRIM; BY BYVAR; IF FIRST.BYVAR
  THEN PUT _PAGE_; PUTL;
  IF LAST.BYVAR THEN DO; PUT / @25
  'TRIMMED MEANS' /; DO P=0 TO 20 BY 5;
  C=P*2+10; PUT @C P 8. '%' @; END;
  PUT / @5 '  N ' @10 (N1-N5) (10.0) /
    @5 'MEAN' @10 (M1-M5) (10.2) /
    @5 ' STD' @10 (S1-S5) (10.2) ; END;
```

```
* EXAMPLE #4 - SIDE BY SIDE             *;

MACRO READO DSNIN; INCC; IF CC='1'
THEN DO; C+1; P=MOD(C-1,NP)+1;
IF P=SP THEN I=0; INBV; END; RETAIN P;
I+1; INL; LC; %
PPTN; PROC GLM; BY BYVAR; CLASS TRT BLK;
      MODEL Y=TRT|BLK / SS3;
      LSMEANS TRT / PDIFF;
      OUTPUT OUT=RES RESIDUAL=RES; PPT;
DATA LEFT RIGHT; BYVAR=.;
MACRO NP 3 % MACRO SP 2 %
MACRO DSN LEFT % MACRO LINE LEFT %
 MACRO LC IF 2<=P<=3 % READO;
PROC MEANS NOPRINT DATA=DATA; BY BYVAR
TRT BLK;VAR Y;OUTPUT OUT=MEAN MEAN=MEAN;
PPTN; PROC PLOT DATA=MEAN; BY BYVAR;
      PLOT MEAN*BLK=TRT / HREF=0; PPT;
MACRO NP 1 % MACRO SP 1 %
MACRO DSN RIGHT % MACRO LINE RIGHT %
```

```
MACRO LC IF P=1 % READO; OPTIONS LS=132;
DATA _NULL_; FILE PRINT LL=LL;
MERGE LEFT RIGHT; BY BYVAR I;IF BYVAR>.;
IF FIRST.BYVAR THEN PUT _PAGE_;
PUT LEFT $CHAR64. ' ' || ' ' RIGHT $CHAR64.;
IF LAST.BYVAR THEN DO WHILE(LL>1);
   PUT @66 '||'; END;


* EXAMPLE 5  - MANY GLMS PER PAGE      *;

MACRO MACGLM PPTN; PROC GLM DATA=DATA;
   CLASS T B; MODEL Y= MDL /SS3;
   LSMEANS T / PDIFF; PPT;
DSNIN; INCC; IF CC='1' THEN DO; PC+1;
PG=MOD(PC-1,3)+1; RETAIN PG; I=0; INBV;
END; INL; AN=ANEQ; IF LINE='
THEN DELETE; I+1; IF LC; DATA PDS;
SET PDS DSN; BY BYVAR AN PG I; %
MACRO T TRT % MACRO B BLK %
DATA LDS RDS; BYVAR=.; PG=.; AN=.; I=.;
MACRO PDS LDS % MACRO LINE LDS %
MACRO MDL T|B % MACRO ANEQ 1 %
MACRO LC 2<=PG<=3 % MACGLM;
MACRO MDL T|B X X*T*B % MACRO ANEQ 2 %
MACRO LC PG=2 & (I=10 | I=15);
IF I=15 THEN I=13 % MACGLM;
MACRO MDL X T|B % MACRO ANEQ 3 %
MACRO LC 2<=PG<=3 % MACGLM;
MACRO PDS RDS % MACRO LINE RDS %
MACRO MDL T % MACRO ANEQ 1 %
MACRO LC 2<=PG<=3 % MACGLM;
MACRO MDL T X X*T % MACRO ANEQ 2 %
MACRO LC PG=2 & (I=10 | I=13); %
MACGLM;
MACRO MDL X T % MACRO ANEQ 3 %
MACRO LC 2<=PG<=3 % MACGLM;
OPTIONS LS=132; PROC FORMAT;
VALUE AN1F 1=ONE WAY ANOVA
2=HOMOGENIETY TEST 3=ONE WAV COVA;
VALUE AN2F 1=TWO WAY ANOVA
2=HOMOGENIETY TEST 3=TWO WAV COVA;
DATA _NULL_; FILE PRINT LL=LL;
MERGE RDS LDS; BY BYVAR AN PG I;
IF I>.; IF FIRST.BYVAR THEN PUT _PAGE_;
IF FIRST.AN THEN PUT @66 '||' / @25 AN
AN2F. @66 '||' @88 AN AN1F. / @66 '||';
PUT LDS $CHAR64. ' ' || ' ' RDS $CHAR64.;


* - EXAMPLE 6 - RE-ROUTING THE OUTPUT *;

PPTN; PROC GLM; BY VAR; CLASS TRT;
      MODEL Y=X TRT / SS2; PPT;
MACRO DSN INP %
DSNIN; INCC; INBV; INL; DUMMY=1;
DATA _NULL_; FILE SASIN; SET INP;
BY DUMMY BYVAR; IF FIRST.DUMMY THEN PUT
'PROC TAG; BY BYVAR;' / 'PARMCARDS;';
IF FIRST.BYVAR THEN PUT 'GEN PAGE.' /
'WINDOW 1. 7.5 1. 10.' /
'TB 1 STYLE TRIPLEX, TEXT'; PUTL;
IF LAST.BYVAR THEN PUT '.' / 'GO.'; RUN;
// DD DSN=*.SASIN,DISP=(OLD,DELETE),
//    UNIT=DISK,VOL=REF=*.SASIN
```

FIGURE #1
SUPPRESSING THE CARRIAGE CONTROL - ONE PAGE FOR GLM OUTPUT

BYVAR=1

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: Y

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE
MODEL	3	7405.41452418	2468.47150806
ERROR	296	296.04824401	1.00016299
CORRECTED TOTAL	299	7701.46276818	

MODEL F =	2468.07	PR > F =	0.0001

R-SQUARE	C.V.	STD DEV	Y MEAN
0.961559	234.1209	1.00008149	0.42716450

SOURCE	DF	TYPE II SS	F VALUE	PR > F
X	1	7341.57622170	7340.38	0.0001
TRT	2	1.32771853	0.66	0.5157

BYVAR=1

GENERAL LINEAR MODELS PROCEDURE

LEAST SQUARES MEANS

TRT	Y LSMEAN	PROB > |T| H0: LSMEAN(I)=LSMEAN(J) I/J	1	2	3
1	0.40727008	1		0.4403	0.7261
2	0.51675236	2	0.4403		0.2612
3	0.35747105	3	0.7261	0.2612	

NOTE: TO ENSURE OVERALL PROTECTION LEVEL, ONLY PROBABILITIES ASSOCIATED WITH PRE-PLANNED COMPARISONS SHOULD BE USED.

FIGURE #2
LOTS OF FREQS
BYVAR=1
TABLE OF LEVEL BY TRT

LEVEL FREQUENCY | TRT 1	2	3	TOTAL
0 | 51	47	53	151
1 | 49	53	47	149
TOTAL 100	100	100	300

BYVAR=2
TABLE OF LEVEL BY TRT

LEVEL FREQUENCY | TRT 1	2	3	TOTAL
0 | 43	62	46	151
1 | 57	38	54	149
TOTAL 100	100	100	300

BYVAR=3
TABLE OF LEVEL BY TRT

LEVEL FREQUENCY | TRT 1	2	3	TOTAL
0 | 43	54	45	142
1 | 57	46	55	158
TOTAL 100	100	100	300

BYVAR=4
TABLE OF LEVEL BY TRT

LEVEL FREQUENCY | TRT 1	2	3	TOTAL
0 | 51	47	53	151
1 | 49	53	47	149
TOTAL 100	100	100	300

BYVAR=5
TABLE OF LEVEL BY TRT

LEVEL FREQUENCY | TRT 1	2	3	TOTAL
0 | 43	62	46	151
1 | 57	38	54	149
TOTAL 100	100	100	300

FIGURE #3
ENHANCING OUTPUT

BYVAR=1

UNIVARIATE

VARIABLE=Y

MOMENTS

N	300	SUM WGTS	300
MEAN	-0.324529	SUM	-97.3588
STD DEV	5.16625	VARIANCE	26.6901
SKEWNESS	-0.118004	KURTOSIS	-0.111883
USS	8011.94	CSS	7980.34
CV	-1591.92	STD MEAN	0.298273
T:MEAN=0	-1.08803	PROB>|T|	0.27746

QUANTILES(DEF=4)

100% MAX	14.0642	99%	10.8808
75% Q3	3.30971	95%	8.22
50% MED	-0.436347	90%	6.35848
25% Q1	-3.56384	10%	-7.57236
0% MIN	-14.5293	5%	-8.97769
		1%	-14.2116
RANGE	28.5935		
Q3-Q1	6.87355		
MODE	-14.5293		

EXTREMES

LOWEST	ID	HIGHEST	ID
-14.5293(	14)	9.93042(	19)
-14.3968(	3)	10.7705(	5)
-14.2153(	15)	10.8819(	11)
-13.8398(	2)	11.2655(	17)
-12.1623(	13)	14.0642(	12)

TRIMMED MEANS

	0%	5%	10%	15%	20%
N	300	285	270	255	240
MEAN	-0.32	-0.20	-0.21	-0.32	-0.30
STD	5.17	5.23	5.17	5.20	5.21

FIGURE #4

BYVAR=1

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: Y

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE
MODEL	14	246.18449488	17.58460678
ERROR	285	7474.22613348	26.22535485
CORRECTED TOTAL	299	7720.41062836	

MODEL F = 0.67 PR > F = 0.8026

R-SQUARE	C.V.	STD DEV	Y MEAN
0.031887	1424.3914	5.12106970	0.35952687

SOURCE	DF	TYPE III SS	F VALUE	PR > F
TRT	2	59.81572121	1.14	0.3211
BLK	4	142.10078725	1.35	0.2499
TRT*BLK	8	44.26798641	0.21	0.9889

BYVAR=1

GENERAL LINEAR MODELS PROCEDURE

LEAST SQUARES MEANS

TRT	Y LSMEAN	PROB > |T| HO: LSMEAN(I)=LSMEAN(J) I/J	1	2	3
1	-0.16074164	1	.	0.1333	0.5165
2	0.92961130	2	0.1333	.	0.3927
3	0.30971094	3	0.5165	0.3927	

NOTE: TO ENSURE OVERALL PROTECTION LEVEL, ONLY PROBABILITIES ASSOCIATED WITH PRE-PLANNED COMPARISONS SHOULD BE USED.

BYVAR=1

UNIVARIATE

VARIABLE=RES

MOMENTS

N	300	SUM WGTS	300
MEAN	3.407E-16	SUM	1.022E-13
STD DEV	4.99974	VARIANCE	24.9974
SKEWNESS	0.0123568	KURTOSIS	-0.544326
USS	7474.23	CSS	7474.23
CV	1.467E+18	STD MEAN	0.28866
T:MEAN=0	1.180E-15	PROB>|T|	1

QUANTILES(DEF=4)

100% MAX	11.9163	99%	11.1351
75% Q3	3.35615	95%	8.24257
50% MED	0.155854	90%	6.54624
25% Q1	-3.81481	10%	-6.73726
0% MIN	-10.7817	5%	-8.6551
		1%	-10.0385
RANGE	22.6981		
Q3-Q1	7.17096		
MODE	-10.7817		

EXTREMES

LOWEST	ID	HIGHEST	ID
-10.7817(	3)	10.7005(	4)
-10.6532(	2)	10.8551(	18)
-10.0389(	3)	11.138(	14)
-9.99819(	5)	11.3129(	16)
-9.92468(	8)	11.9163(	14)

FIGURE #4A
GLM BESIDE PLOT OF CELL MEANS

BYVAR=1

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: Y

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE
MODEL	14	329.30737992	23.52195571
ERROR	285	7650.02144972	26.84218053
CORRECTED TOTAL	299	7979.32882964	

MODEL F = 0.88 PR > F = 0.5852

R-SQUARE	C.V.	STD DEV	Y MEAN
0.041270	5723.7805	5.18094398	-0.09051612

SOURCE	DF	TYPE III SS	F VALUE	PR > F
TRT	2	150.52621754	2.80	0.0622
BLK	4	54.34821834	0.51	0.7312
TRT*BLK	8	124.43294404	0.58	0.7946

BYVAR=1

GENERAL LINEAR MODELS PROCEDURE

LEAST SQUARES MEANS

TRT	Y LSMEAN	PROB > |T| HO: LSMEAN(I)=LSMEAN(J) I/J	1	2	3
1	0.70144394	1	.	0.0196	0.3709
2	-1.01774989	2	0.0196	.	0.1481
3	0.04475759	3	0.3709	0.1481	.

NOTE: TO ENSURE OVERALL PROTECTION LEVEL, ONLY PROBABILITIES ASSOCIATED WITH PRE-PLANNED COMPARISONS SHOULD BE USED.

BYVAR=1

PLOT OF MEAN*BLK SYMBOL IS VALUE OF TRT

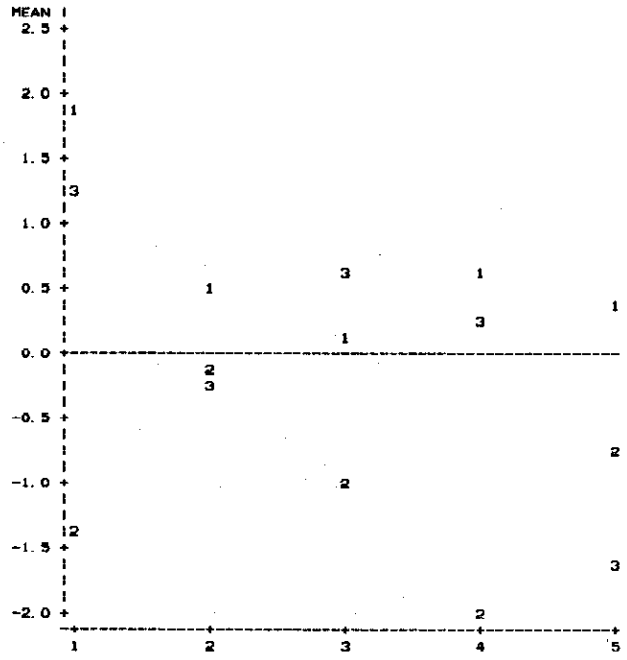

FIGURE #5
MANY GLMS PER PAGE

TWO WAY ANOVA

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: Y

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE
MODEL	14	395.06433385	28.21888099
ERROR	885	24176.61819168	27.31821265
CORRECTED TOTAL	899	24571.68252553	

MODEL F = 1.03 PR > F = 0.4174

R-SQUARE	C.V.	STD DEV	Y MEAN
0.016078	99999.9999	5.22668276	-0.00191696

SOURCE	DF	TYPE III SS	F VALUE	PR > F
TRT	2	67.97716480	1.24	0.2887
BLK	4	9.36181881	0.09	0.9869
TRT*BLK	8	317.72535024	1.45	0.1703

GENERAL LINEAR MODELS PROCEDURE

LEAST SQUARES MEANS

TRT	Y LSMEAN	PROB > |T| HO: LSMEAN(I)=LSMEAN(J) I/J	1	2	3
1	0.30664767	1	.	0.1181	0.5453
2	-0.36086040	2	0.1181	.	0.3377
3	0.04846186	3	0.5453	0.3377	.

NOTE: TO ENSURE OVERALL PROTECTION LEVEL, ONLY PROBABILITIES ASSOCIATED WITH PRE-PLANNED COMPARISONS SHOULD BE USED.

HOMOGENIETY TEST

SOURCE	DF	TYPE III SS	F VALUE	PR > F
X*TRT*BLK	14	10.14141647	0.71	0.7653

TWO WAY COVA

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: Y

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE
MODEL	14	395.06433385	28.21888099
ERROR	885	24176.61819168	27.31821265
CORRECTED TOTAL	899	24571.68252553	

MODEL F = 1.03 PR > F = 0.4174

R-SQUARE	C.V.	STD DEV	Y MEAN
0.016078	99999.9999	5.22668276	-0.00191696

SOURCE	DF	TYPE III SS	F VALUE	PR > F
TRT	2	67.97716480	1.24	0.2887
BLK	4	9.36181881	0.09	0.9869
TRT*BLK	8	317.72535024	1.45	0.1703

GENERAL LINEAR MODELS PROCEDURE

LEAST SQUARES MEANS

TRT	Y LSMEAN	PROB > |T| HO: LSMEAN(I)=LSMEAN(J) I/J	1	2	3
1	0.30664767	1	.	0.1181	0.5453
2	-0.36086040	2	0.1181	.	0.3377
3	0.04846186	3	0.5453	0.3377	.

NOTE: TO ENSURE OVERALL PROTECTION LEVEL, ONLY PROBABILITIES ASSOCIATED WITH PRE-PLANNED COMPARISONS SHOULD BE USED.

ONE WAY ANOVA

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: Y

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE
MODEL	2	67.97716480	33.98858240
ERROR	897	24503.70536073	27.31739728
CORRECTED TOTAL	899	24571.68252553	

MODEL F = 1.24 PR > F = 0.2887

R-SQUARE	C.V.	STD DEV	Y MEAN
0.002766	99999.9999	5.22660476	-0.00191696

SOURCE	DF	TYPE III SS	F VALUE	PR > F
TRT	2	67.97716480	1.24	0.2887

GENERAL LINEAR MODELS PROCEDURE

LEAST SQUARES MEANS

TRT	Y LSMEAN	PROB > |T| HO: LSMEAN(I)=LSMEAN(J) I/J	1	2	3
1	0.30664767	1	.	0.1181	0.5453
2	-0.36086040	2	0.1181	.	0.3377
3	0.04846186	3	0.5453	0.3377	.

NOTE: TO ENSURE OVERALL PROTECTION LEVEL, ONLY PROBABILITIES ASSOCIATED WITH PRE-PLANNED COMPARISONS SHOULD BE USED.

HOMOGENIETY TEST

SOURCE	DF	TYPE III SS	F VALUE	PR > F
X*TRT	2	3.81929409	1.89	0.1517

ONE WAY COVA

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: Y

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE
MODEL	2	67.97716480	33.98858240
ERROR	897	24503.70536073	27.31739728
CORRECTED TOTAL	899	24571.68252553	

MODEL F = 1.24 PR > F = 0.2887

R-SQUARE	C.V.	STD DEV	Y MEAN
0.002766	99999.9999	5.22660476	-0.00191696

SOURCE	DF	TYPE III SS	F VALUE	PR > F
TRT	2	67.97716480	1.24	0.2887

GENERAL LINEAR MODELS PROCEDURE

LEAST SQUARES MEANS

TRT	Y LSMEAN	PROB > |T| HO: LSMEAN(I)=LSMEAN(J) I/J	1	2	3
1	0.30664767	1	.	0.1181	0.5453
2	-0.36086040	2	0.1181	.	0.3377
3	0.04846186	3	0.5453	0.3377	.

NOTE: TO ENSURE OVERALL PROTECTION LEVEL, ONLY PROBABILITIES ASSOCIATED WITH PRE-PLANNED COMPARISONS SHOULD BE USED.

FIGURE #6
PAGE FULL OF FREQS

BYVAR=1
TABLE OF LEVEL BY TRT

LEVEL / FREQUENCY	TRT 1	2	3	TOTAL
0	53	49	52	154
1	47	51	48	146
TOTAL	100	100	100	300

BYVAR=2
TABLE OF LEVEL BY TRT

LEVEL / FREQUENCY	TRT 1	2	3	TOTAL
0	45	53	46	144
1	55	47	54	156
TOTAL	100	100	100	300

BYVAR=3
TABLE OF LEVEL BY TRT

LEVEL / FREQUENCY	TRT 1	2	3	TOTAL
0	52	48	47	147
1	48	52	53	153
TOTAL	100	100	100	300

BYVAR=4
TABLE OF LEVEL BY TRT

LEVEL / FREQUENCY	TRT 1	2	3	TOTAL
0	53	49	52	154
1	47	51	48	146
TOTAL	100	100	100	300

BYVAR=5
TABLE OF LEVEL BY TRT

LEVEL / FREQUENCY	TRT 1	2	3	TOTAL
0	45	53	46	144
1	55	47	54	156
TOTAL	100	100	100	300

BYVAR=1
TABLE OF LEVEL BY TRT

LEVEL / FREQUENCY	TRT 1	2	3	TOTAL
0	56	63	57	176
1	44	37	43	124
TOTAL	100	100	100	300

BYVAR=2
TABLE OF LEVEL BY TRT

LEVEL / FREQUENCY	TRT 1	2	3	TOTAL
0	61	60	60	181
1	39	40	40	119
TOTAL	100	100	100	300

BYVAR=3
TABLE OF LEVEL BY TRT

LEVEL / FREQUENCY	TRT 1	2	3	TOTAL
0	54	61	59	174
1	46	39	41	126
TOTAL	100	100	100	300

BYVAR=4
TABLE OF LEVEL BY TRT

LEVEL / FREQUENCY	TRT 1	2	3	TOTAL
0	56	63	57	176
1	44	37	43	124
TOTAL	100	100	100	300

BYVAR=5
TABLE OF LEVEL BY TRT

LEVEL / FREQUENCY	TRT 1	2	3	TOTAL
0	61	60	60	181
1	39	40	40	119
TOTAL	100	100	100	300

FIGURE 7
PLOTTING OUTPUT

BYVAR=1

GENERAL LINEAR MODELS PROCEDURE

DEPENDENT VARIABLE: Y

SOURCE	DF	SUM OF SQUARES	MEAN SQUARE
MODEL	3	7339.91548335	2446.63849445
ERROR	296	281.15601754	0.94985141
CORRECTED TOTAL	299	7621.07150088	

MODEL F = 2575.81 PR F = 0.0001

R-SQUARE	C.V.	STD DEV	Y MEAN
0.963108	359.0108	0.97460321	-0.27146904

SOURCE	DF	TYPE I I SS	F VALUE	PR F
X	1	7332.75227225	7719.89	0.0001
TRT	2	4.87286591	2.57	0.0786

BYVAR=1

GENERAL LINEAR MODELS PROCEDURE

LEAST SQUARES MEANS

TRT	LSMEAN	I/J	1	2	3
1	-0.21712508	1	.	0.6257	0.0957
2	-0.14981245	2	0.6257	.	0.0316
3	-0.44746980	3	0.0957	0.0316	.

NOTE: TO ENSURE OVERALL PROTECTION LEVEL, ONLY PROBABILITIES ASSOCIATED WITH PRE-PLANNED COMPARISONS SHOULD BE USED.