Within-Cases: Multivariate approach part two

pain1.data

```
          pain1 pain2 pain3 pain4 pain5 pain6
 1         7.0   8.0   9.0  10.0   7.0   6.5
 2         7.5   6.0   5.5   6.0   4.5   7.5
 3         3.0   4.5   6.0   6.5   5.5   8.5
 4         3.0   1.5   0.0   5.0   0.0   2.0
 5         5.0   3.5   4.5   5.5   1.5   5.5
 6         8.0   6.0   4.0   6.5   5.5   4.5
 7         7.5   4.5   5.5   5.0   5.5   6.0
 8         7.5   4.0   0.5   3.5   4.5   7.5
 9         7.5   4.5   4.0   7.5   4.5   6.0
10         6.0   7.5   5.5   7.5   6.0   6.5
```

```
/* pain1.sas */
options linesize=79 pagesize=100 noovp formdlim='_';
title 'Multivariate repeated measures analysis of the pain data';

/*        Dose 1     Dose 2     Dose 3

          ------     -----      ------
Drug 1    pain1      pain2      pain3
Drug 2    pain4      pain5      pain6           */

data ouch;
     infile 'pain1.data' firstobs=2; /* Skip the labels */
     input patient pain1-pain6;
     Drug1 = mean(of pain1-pain3); Drug2 = mean(of pain4-pain6);
     Dose1 = (pain1+pain4)/2; Dose2=(pain2+pain5)/2; Dose3 = (pain3+pain6)/2;
     drugdiff = drug1-drug2;
     dosed1 = dose1-dose2; dosed2 = dose2-dose3;
     int1 = (pain1-pain4)-(pain2-pain5); int2 = (pain2-pain5)-(pain3-pain6);
     d12 = pain1-pain2; d13 = pain1-pain3; d14 = pain1-pain4;
     d15 = pain1-pain5; d16 = pain1-pain6; d23 = pain2-pain3;
     d24 = pain2-pain4; d25 = pain2-pain5; d26 = pain2-pain6;
     d34 = pain3-pain4; d35 = pain3-pain5; d36 = pain3-pain6;
     d45 = pain4-pain5; d46 = pain4-pain6; d56 = pain5-pain6;
     int3 = (pain1-pain4)-(pain3-pain6);

proc means n mean stddev;
     var Drug1 -- Dose3  pain1-pain6;

proc reg;
     title2 'Overall test';
     model d12-d16 = ;
     Overall: mtest intercept = 0;

proc reg;
     title2 'Main Effect of Drug';
     model drugdiff = ;
     Drug: mtest intercept = 0;
     /* Could have used test or just looked at the t statistic. */
```

```
proc reg;
     title2 'Main Effect of Dose Level';
     model dosed1 dosed2 = ;
     Dose: mtest intercept = 0;

proc reg;
     title2 'Drug by Dose Interaction';
     model int1 int2 = ;
     Drug_by_Dose: mtest intercept = 0;

proc means n mean t probt;
     title2 'Follow up with matched t-tests';
     var d12 -- d56 int1-int3;

proc glm;
     title2 'Two-factor within cases the easy way';
     model pain1-pain6 = ;
     repeated Drug 2, Dosage 3 / short summary mean;
     /* Factor on the right changes fastest (like numbers) */

proc glm;
     title2 'Overall test the easy way';
     model pain1-pain6 = ;
     repeated treatment / short summary mean;
```

The MEANS Procedure

Variable	N	Mean	Std Dev
Drug1	10	5.2166667	1.7586646
Drug2	10	5.6000000	1.5238839
Dose1	10	6.2500000	1.3743685
Dose2	10	4.7250000	1.9523846
Dose3	10	5.2500000	1.9257033
pain1	10	6.2000000	1.9032137
pain2	10	5.0000000	1.9293062
pain3	10	4.4500000	2.6294275
pain4	10	6.3000000	1.7826323
pain5	10	4.4500000	2.1272047
pain6	10	6.0500000	1.8173546

                         Overall test

The REG Procedure
Model: MODEL1
Dependent Variable: d12

Number of Observations Read   10
Number of Observations Used   10

```
                        Analysis of Variance

                                Sum of           Mean
Source                  DF     Squares         Square     F Value    Pr > F

Model                    0           0            .          .         .
Error                    9    32.10000        3.56667
Corrected Total          9    32.10000


              Root MSE              1.88856    R-Square     0.0000
              Dependent Mean        1.20000    Adj R-Sq     0.0000
              Coeff Var           157.38017


                        Parameter Estimates

                      Parameter      Standard
       Variable    DF   Estimate        Error    t Value    Pr > |t|

       Intercept    1    1.20000      0.59722       2.01      0.0754
```
_____

                           Overall test

                         The REG Procedure
                          Model: MODEL1
                     Dependent Variable: d13

                 Number of Observations Read   10
                 Number of Observations Used   10


```
                        Analysis of Variance

                                Sum of           Mean
Source                  DF     Squares         Square     F Value    Pr > F

Model                    0           0            .          .         .
Error                    9    77.12500        8.56944
Corrected Total          9    77.12500


              Root MSE              2.92736    R-Square     0.0000
              Dependent Mean        1.75000    Adj R-Sq     0.0000
              Coeff Var           167.27779


                        Parameter Estimates

                      Parameter      Standard
       Variable    DF   Estimate        Error    t Value    Pr > |t|

       Intercept    1    1.75000      0.92571       1.89      0.0913
```

The REG Procedure
Model: MODEL1
Dependent Variable: d14

Number of Observations Read   10
Number of Observations Used   10

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	0	0	.	.	.
Error	9	54.40000	6.04444		
Corrected Total	9	54.40000			

Root MSE	2.45855	R-Square	0.0000	
Dependent Mean	-0.10000	Adj R-Sq	0.0000	
Coeff Var	-2458.54519			

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|
Intercept	1	-0.10000	0.77746	-0.13	0.9005

The REG Procedure
Model: MODEL1
Dependent Variable: d15

Number of Observations Read   10
Number of Observations Used   10

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	0	0	.	.	.
Error	9	34.12500	3.79167		
Corrected Total	9	34.12500			

```
          Root MSE                   1.94722   R-Square       0.0000
          Dependent Mean             1.75000   Adj R-Sq       0.0000
          Coeff Var                111.26973


                            Parameter Estimates

                          Parameter        Standard
          Variable     DF    Estimate          Error    t Value    Pr > |t|

          Intercept     1     1.75000        0.61577       2.84      0.0193
```

```
                            The REG Procedure
                             Model: MODEL1
                        Dependent Variable: d16

                Number of Observations Read          10
                Number of Observations Used          10


                          Analysis of Variance

                               Sum of          Mean
Source                 DF      Squares        Square     F Value    Pr > F

Model                   0            0           .           .         .
Error                   9     48.52500      5.39167
Corrected Total         9     48.52500


          Root MSE                   2.32200   R-Square       0.0000
          Dependent Mean             0.15000   Adj R-Sq       0.0000
          Coeff Var               1547.99751


                            Parameter Estimates

                          Parameter        Standard
          Variable     DF    Estimate          Error    t Value    Pr > |t|

          Intercept     1     0.15000        0.73428       0.20      0.8427
```

                              The REG Procedure
                               Model: MODEL1
                          Multivariate Test: Overall

                 Multivariate Statistics and Exact F Statistics

                         S=1   M=1.5   N=1.5

Statistic   Value   F Value   Num DF   Den DF   Pr > F

Wilks' Lambda   0.26024160   2.84   5   5   0.1381
Pillai's Trace   0.73975840   2.84   5   5   0.1381
Hotelling-Lawley Trace   2.84258317   2.84   5   5   0.1381
Roy's Greatest Root   2.84258317   2.84   5   5   0.1381

_____

                              The REG Procedure
                               Model: MODEL1
                         Dependent Variable: drugdiff

                  Number of Observations Read   10
                  Number of Observations Used   10

                          Analysis of Variance

                                Sum of   Mean
Source   DF   Squares   Square   F Value   Pr > F

Model   0   0   .   .   .
Error   9   7.11389   0.79043
Corrected Total   9   7.11389

             Root MSE   0.88906   R-Square   0.0000
             Dependent Mean   -0.38333   Adj R-Sq   0.0000
             Coeff Var   -231.92934

                          Parameter Estimates

                     Parameter   Standard
      Variable   DF   Estimate   Error   t Value   Pr > |t|

      Intercept   1   -0.38333   0.28115   -1.36   0.2059

                          Main Effect of Drug

                          The REG Procedure
                           Model: MODEL1
                        Multivariate Test: Drug

                  Multivariate Statistics and Exact F Statistics

                        S=1   M=-0.5   N=3.5

Statistic   Value   F Value   Num DF   Den DF   Pr > F

Wilks' Lambda   0.82880259   1.86   1   9   0.2059
Pillai's Trace   0.17119741   1.86   1   9   0.2059
Hotelling-Lawley Trace   0.20655994   1.86   1   9   0.2059
Roy's Greatest Root   0.20655994   1.86   1   9   0.2059

                        Main Effect of Dose Level

                          The REG Procedure
                           Model: MODEL1
                       Dependent Variable: dosed1

                    Number of Observations Read   10
                    Number of Observations Used   10

                          Analysis of Variance

                              Sum of   Mean
Source   DF   Squares   Square   F Value   Pr > F

Model   0   0   .   .   .
Error   9   12.55625   1.39514
Corrected Total   9   12.55625

            Root MSE   1.18116   R-Square   0.0000
            Dependent Mean   1.52500   Adj R-Sq   0.0000
            Coeff Var   77.45311

                          Parameter Estimates

                      Parameter   Standard
      Variable   DF   Estimate   Error   t Value   Pr > |t|

      Intercept   1   1.52500   0.37352   4.08   0.0027

The REG Procedure
Model: MODEL1
Dependent Variable: dosed2

Number of Observations Read   10
Number of Observations Used   10

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	0	0	.	.	.
Error	9	13.93125	1.54792		
Corrected Total	9	13.93125			

Root MSE	1.24415	R-Square	0.0000	
Dependent Mean	-0.52500	Adj R-Sq	0.0000	
Coeff Var	-236.98152			

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|
Intercept	1	-0.52500	0.39344	-1.33	0.2148

The REG Procedure
Model: MODEL1
Multivariate Test: Dose

Multivariate Statistics and Exact F Statistics

S=1   M=0   N=3

Statistic	Value	F Value	Num DF	Den DF	Pr > F
Wilks' Lambda	0.33765103	7.85	2	8	0.0130
Pillai's Trace	0.66234897	7.85	2	8	0.0130
Hotelling-Lawley Trace	1.96163760	7.85	2	8	0.0130
Roy's Greatest Root	1.96163760	7.85	2	8	0.0130

The REG Procedure
Model: MODEL1
Dependent Variable: int1

Number of Observations Read   10
Number of Observations Used   10

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	0	0	.	.	.
Error	9	79.02500	8.78056		
Corrected Total	9	79.02500			

Root MSE	2.96320	R-Square	0.0000	
Dependent Mean	-0.65000	Adj R-Sq	0.0000	
Coeff Var	-455.87696			

Parameter Estimates

Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|
Intercept	1	-0.65000	0.93705	-0.69	0.5054

The REG Procedure
Model: MODEL1
Dependent Variable: int2

Number of Observations Read   10
Number of Observations Used   10

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	0	0	.	.	.
Error	9	45.52500	5.05833		
Corrected Total	9	45.52500			

Root MSE	2.24907	R-Square	0.0000

```
        Dependent Mean        2.15000    Adj R-Sq     0.0000
        Coeff Var           104.60809


                        Parameter Estimates

                    Parameter       Standard
     Variable    DF    Estimate         Error    t Value    Pr > |t|

     Intercept    1     2.15000       0.71122       3.02      0.0144

_____


                  Multivariate Test: Drug_by_Dose

             Multivariate Statistics and Exact F Statistics

                         S=1     M=0     N=3

Statistic                      Value    F Value    Num DF    Den DF    Pr > F

Wilks' Lambda              0.43171577     5.27        2         8      0.0347
Pillai's Trace             0.56828423     5.27        2         8      0.0347
Hotelling-Lawley Trace     1.31633881     5.27        2         8      0.0347
Roy's Greatest Root        1.31633881     5.27        2         8      0.0347




_____

       Multivariate repeated measures analysis of the pain data        16
                  Follow up with matched t-tests

                        The MEANS Procedure

          Variable     N          Mean    t Value    Pr > |t|
          -------------------------------------------------------
          d12         10     1.2000000       2.01      0.0754
          d13         10     1.7500000       1.89      0.0913
          d14         10    -0.1000000      -0.13      0.9005
          d15         10     1.7500000       2.84      0.0193
          d16         10     0.1500000       0.20      0.8427
          d23         10     0.5500000       1.04      0.3260
          d24         10    -1.3000000      -2.98      0.0154
          d25         10     0.5500000       1.56      0.1538
          d26         10    -1.0500000      -1.72      0.1204
          d34         10    -1.8500000      -3.51      0.0066
          d35         10             0       0.00      1.0000
          d36         10    -1.6000000      -2.14      0.0612
          d45         10     1.8500000       3.08      0.0132
          d46         10     0.2500000       0.33      0.7477
          d56         10    -1.6000000      -3.01      0.0147
          int1        10    -0.6500000      -0.69      0.5054
          int2        10     2.1500000       3.02      0.0144
          int3        10     1.5000000       1.13      0.2890
          -------------------------------------------------------

_____
```
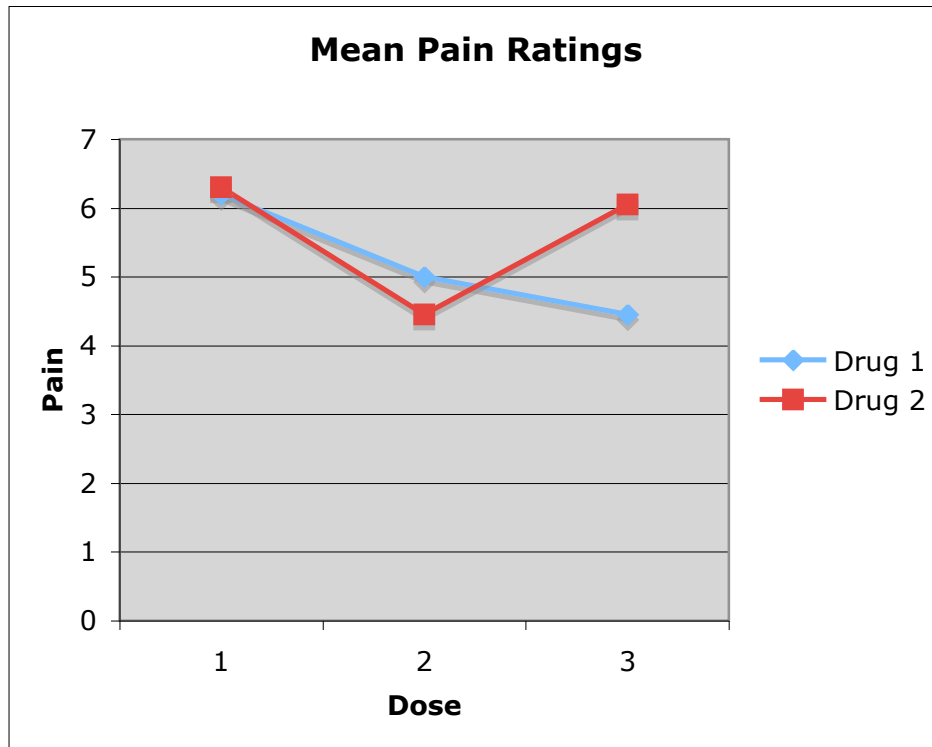
Mean Pain Ratings

P-values for pairwise difference tests (unadjusted)

Drug	Dose	Drug 1			Drug 2		
		Dose 1	Dose 2	Dose 3	Dose 1	Dose 2	Dose 3
1	1		0.0754	0.0913	0.9005	0.0193	0.8427
1	2			0.3260	0.0154	0.1538	0.1204
1	3				0.0066	1.0000	0.0612
2	1					0.0132	0.7477
2	2						0.0147
2	3						

But note: `0.0066 * 15 = 0.099`

The GLM Procedure

Number of Observations Read   10
Number of Observations Used   10

_____

The GLM Procedure

Dependent Variable: pain1

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	384.4000000	384.4000000	106.12	<.0001
Error	9	32.6000000	3.6222222		
Uncorrected Total	10	417.0000000			

R-Square	Coeff Var	Root MSE	pain1 Mean
0.000000	30.69699	1.903214	6.200000

Source	DF	Type I SS	Mean Square	F Value	Pr > F
Intercept	1	384.4000000	384.4000000	106.12	<.0001

Source	DF	Type III SS	Mean Square	F Value	Pr > F
Intercept	1	384.4000000	384.4000000	106.12	<.0001

Parameter	Estimate	Standard Error	t Value	Pr > |t|
Intercept	6.200000000	0.60184900	10.30	<.0001

_____

Multivariate repeated measures analysis of the pain data   19
                Two-factor within cases the easy way
                      The GLM Procedure

Dependent Variable: pain2

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	250.0000000	250.0000000	67.16	<.0001
Error	9	33.5000000	3.7222222		
Uncorrected Total	10	283.5000000			

R-Square	Coeff Var	Root MSE	pain2 Mean
0.000000	38.58612	1.929306	5.000000

Source	DF	Type I SS	Mean Square	F Value	Pr > F
Intercept	1	250.0000000	250.0000000	67.16	<.0001

Source	DF	Type III SS	Mean Square	F Value	Pr > F
Intercept	1	250.0000000	250.0000000	67.16	<.0001

Parameter	Estimate	Standard Error	t Value	Pr > |t|
Intercept	5.000000000	0.61010017	8.20	<.0001

Dependent Variable: pain3

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	198.0250000	198.0250000	28.64	0.0005
Error	9	62.2250000	6.9138889		
Uncorrected Total	10	260.2500000			

R-Square	Coeff Var	Root MSE	pain3 Mean
0.000000	59.08826	2.629427	4.450000

Source	DF	Type I SS	Mean Square	F Value	Pr > F
Intercept	1	198.0250000	198.0250000	28.64	0.0005

Source	DF	Type III SS	Mean Square	F Value	Pr > F

Intercept		1	198.0250000	198.0250000	28.64	0.0005

Parameter	Estimate	Standard Error	t Value	Pr > |t|
Intercept	4.450000000	0.83149798	5.35	0.0005

Dependent Variable: pain4

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	396.9000000	396.9000000	124.90	<.0001
Error	9	28.6000000	3.1777778		
Uncorrected Total	10	425.5000000			

R-Square	Coeff Var	Root MSE	pain4 Mean
0.000000	28.29575	1.782632	6.300000

Source	DF	Type I SS	Mean Square	F Value	Pr > F
Intercept	1	396.9000000	396.9000000	124.90	<.0001

Source	DF	Type III SS	Mean Square	F Value	Pr > F
Intercept	1	396.9000000	396.9000000	124.90	<.0001

Parameter	Estimate	Standard Error	t Value	Pr > |t|
Intercept	6.300000000	0.56371782	11.18	<.0001

Dependent Variable: pain5

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	198.0250000	198.0250000	43.76	<.0001
Error	9	40.7250000	4.5250000		
Uncorrected Total	10	238.7500000			

R-Square	Coeff Var	Root MSE	pain5 Mean

```
       0.000000        47.80235      2.127205       4.450000


Source                        DF      Type I SS     Mean Square    F Value    Pr > F

Intercept                      1     198.0250000    198.0250000      43.76    <.0001


Source                        DF     Type III SS    Mean Square    F Value    Pr > F

Intercept                      1     198.0250000    198.0250000      43.76    <.0001


                                              Standard
        Parameter           Estimate            Error     t Value     Pr > |t|

        Intercept         4.450000000       0.67268120        6.62       <.0001

_____

Dependent Variable: pain6

                                     Sum of
Source                        DF     Squares       Mean Square    F Value    Pr > F

Model                          1    366.0250000    366.0250000     110.82    <.0001

Error                          9     29.7250000      3.3027778

Uncorrected Total             10    395.7500000


            R-Square      Coeff Var       Root MSE      pain6 Mean

            0.000000      30.03892       1.817355       6.050000


Source                        DF      Type I SS     Mean Square    F Value    Pr > F

Intercept                      1     366.0250000    366.0250000     110.82    <.0001


Source                        DF     Type III SS    Mean Square    F Value    Pr > F

Intercept                      1     366.0250000    366.0250000     110.82    <.0001


                                              Standard
        Parameter           Estimate            Error     t Value     Pr > |t|

        Intercept         6.050000000       0.57469799       10.53       <.0001
```

The GLM Procedure
Repeated Measures Analysis of Variance

Repeated Measures Level Information

Dependent Variable	pain1	pain2	pain3	pain4	pain5	pain6
Level of Drug	1	1	1	2	2	2
Level of Dosage	1	2	3	1	2	3

MANOVA Test Criteria and Exact F Statistics
for the Hypothesis of no Drug Effect
H = Type III SSCP Matrix for Drug
E = Error SSCP Matrix

S=1   M=-0.5   N=3.5

Statistic	Value	F Value	Num DF	Den DF	Pr > F
Wilks' Lambda	0.82880259	1.86	1	9	0.2059
Pillai's Trace	0.17119741	1.86	1	9	0.2059
Hotelling-Lawley Trace	0.20655994	1.86	1	9	0.2059
Roy's Greatest Root	0.20655994	1.86	1	9	0.2059

MANOVA Test Criteria and Exact F Statistics
for the Hypothesis of no Dosage Effect
H = Type III SSCP Matrix for Dosage
E = Error SSCP Matrix

S=1   M=0   N=3

Statistic	Value	F Value	Num DF	Den DF	Pr > F
Wilks' Lambda	0.33765103	7.85	2	8	0.0130
Pillai's Trace	0.66234897	7.85	2	8	0.0130
Hotelling-Lawley Trace	1.96163760	7.85	2	8	0.0130
Roy's Greatest Root	1.96163760	7.85	2	8	0.0130

MANOVA Test Criteria and Exact F Statistics
for the Hypothesis of no Drug*Dosage Effect
H = Type III SSCP Matrix for Drug*Dosage
E = Error SSCP Matrix

S=1   M=0   N=3

Statistic	Value	F Value	Num DF	Den DF	Pr > F
Wilks' Lambda	0.43171577	5.27	2	8	0.0347
Pillai's Trace	0.56828423	5.27	2	8	0.0347
Hotelling-Lawley Trace	1.31633881	5.27	2	8	0.0347
Roy's Greatest Root	1.31633881	5.27	2	8	0.0347

                              The GLM Procedure
                      Repeated Measures Analysis of Variance
                  Univariate Tests of Hypotheses for Within Subject Effects

Source	DF	Type III SS	Mean Square	F Value	Pr > F
Drug	1	2.20416667	2.20416667	1.86	0.2059
Error(Drug)	9	10.67083333	1.18564815		

Source	DF	Type III SS	Mean Square	F Value	Pr > F
Dosage	2	24.00833333	12.00416667	6.39	0.0080
Error(Dosage)	18	33.82500000	1.87916667		

	Adj Pr > F	
Source	G – G	H – F
Dosage	0.0125	0.0080
Error(Dosage)		

Greenhouse-Geisser Epsilon	0.8400
Huynh-Feldt Epsilon	1.0110

Source	DF	Type III SS	Mean Square	F Value	Pr > F
Drug*Dosage	2	12.15833333	6.07916667	2.31	0.1278
Error(Drug*Dosage)	18	47.34166667	2.63009259		

	Adj Pr > F	
Source	G – G	H – F
Drug*Dosage	0.1514	0.1463
Error(Drug*Dosage)		

Greenhouse-Geisser Epsilon	0.6621
Huynh-Feldt Epsilon	0.7323

                              The GLM Procedure
                      Repeated Measures Analysis of Variance
                      Analysis of Variance of Contrast Variables

Drug_N represents the contrast between the nth level of Drug and the last

Contrast Variable: Drug_1

Source	DF	Type III SS	Mean Square	F Value	Pr > F
Mean	1	13.22500000	13.22500000	1.86	0.2059
Error	9	64.02500000	7.11388889		

                              The GLM Procedure
                      Repeated Measures Analysis of Variance
                      Analysis of Variance of Contrast Variables

Dosage_N represents the contrast between the nth level of Dosage and the last

Contrast Variable: Dosage_1

Source	DF	Type III SS	Mean Square	F Value	Pr > F
Mean	1	40.00000000	40.00000000	3.71	0.0862
Error	9	97.00000000	10.77777778		

Contrast Variable: Dosage_2

Source	DF	Type III SS	Mean Square	F Value	Pr > F
Mean	1	11.02500000	11.02500000	1.78	0.2148
Error	9	55.72500000	6.19166667		

                              The GLM Procedure
                      Repeated Measures Analysis of Variance
                      Analysis of Variance of Contrast Variables

Drug_N represents the contrast between the nth level of Drug and the last
Dosage_N represents the contrast between the nth level of Dosage and the last

Contrast Variable: Drug_1*Dosage_1

Source	DF	Type III SS	Mean Square	F Value	Pr > F
Mean	1	22.5000000	22.5000000	1.27	0.2890
Error	9	159.5000000	17.7222222		

Contrast Variable: Drug_1*Dosage_2

Source	DF	Type III SS	Mean Square	F Value	Pr > F
Mean	1	46.22500000	46.22500000	9.14	0.0144
Error	9	45.52500000	5.05833333		

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The GLM Procedure
Repeated Measures Analysis of Variance

Means of Within Subjects Effects

Level of Drug	N	Mean	Std Dev
1	30	5.21666667	2.23098607
2	30	5.60000000	2.02739854

Level of Dosage	N	Mean	Std Dev
1	20	6.25000000	1.79546212
2	20	4.72500000	1.99654307
3	20	5.25000000	2.34801148

Level of Drug	Level of Dosage	N	Mean	Std Dev
1	1	10	6.20000000	1.90321366
1	2	10	5.00000000	1.92930615
1	3	10	4.45000000	2.62942748
2	1	10	6.30000000	1.78263226
2	2	10	4.45000000	2.12720474
2	3	10	6.05000000	1.81735461

The GLM Procedure

Number of Observations Read   10
Number of Observations Used   10

The GLM Procedure

Dependent Variable: pain1

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	384.4000000	384.4000000	106.12	<.0001
Error	9	32.6000000	3.6222222		
Uncorrected Total	10	417.0000000			

R-Square	Coeff Var	Root MSE	pain1 Mean
0.000000	30.69699	1.903214	6.200000

Source	DF	Type I SS	Mean Square	F Value	Pr > F
Intercept	1	384.4000000	384.4000000	106.12	<.0001

Source	DF	Type III SS	Mean Square	F Value	Pr > F
Intercept	1	384.4000000	384.4000000	106.12	<.0001

Parameter	Estimate	Standard Error	t Value	Pr > |t|
Intercept	6.200000000	0.60184900	10.30	<.0001

The GLM Procedure

Dependent Variable: pain2

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	250.0000000	250.0000000	67.16	<.0001
Error	9	33.5000000	3.7222222		
Uncorrected Total	10	283.5000000			

R-Square	Coeff Var	Root MSE	pain2 Mean
0.000000	38.58612	1.929306	5.000000

Source	DF	Type I SS	Mean Square	F Value	Pr > F
Intercept	1	250.0000000	250.0000000	67.16	<.0001

Source	DF	Type III SS	Mean Square	F Value	Pr > F
Intercept	1	250.0000000	250.0000000	67.16	<.0001

Parameter	Estimate	Standard Error	t Value	Pr > |t|
Intercept	5.000000000	0.61010017	8.20	<.0001

Dependent Variable: pain3

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	198.0250000	198.0250000	28.64	0.0005
Error	9	62.2250000	6.9138889		
Uncorrected Total	10	260.2500000			

R-Square	Coeff Var	Root MSE	pain3 Mean
0.000000	59.08826	2.629427	4.450000

Source	DF	Type I SS	Mean Square	F Value	Pr > F
Intercept	1	198.0250000	198.0250000	28.64	0.0005

Source	DF	Type III SS	Mean Square	F Value	Pr > F

Intercept	1	198.0250000	198.0250000	28.64	0.0005

Parameter	Estimate	Standard Error	t Value	Pr > |t|
Intercept	4.450000000	0.83149798	5.35	0.0005

The GLM Procedure

Dependent Variable: pain4

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	396.9000000	396.9000000	124.90	<.0001
Error	9	28.6000000	3.1777778		
Uncorrected Total	10	425.5000000			

R-Square	Coeff Var	Root MSE	pain4 Mean
0.000000	28.29575	1.782632	6.300000

Source	DF	Type I SS	Mean Square	F Value	Pr > F
Intercept	1	396.9000000	396.9000000	124.90	<.0001

Source	DF	Type III SS	Mean Square	F Value	Pr > F
Intercept	1	396.9000000	396.9000000	124.90	<.0001

Parameter	Estimate	Standard Error	t Value	Pr > |t|
Intercept	6.300000000	0.56371782	11.18	<.0001

Dependent Variable: pain5

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	198.0250000	198.0250000	43.76	<.0001
Error	9	40.7250000	4.5250000		
Uncorrected Total	10	238.7500000			

	R-Square	Coeff Var	Root MSE	pain5 Mean
	0.000000	47.80235	2.127205	4.450000

Source	DF	Type I SS	Mean Square	F Value	Pr > F
Intercept	1	198.0250000	198.0250000	43.76	<.0001

Source	DF	Type III SS	Mean Square	F Value	Pr > F
Intercept	1	198.0250000	198.0250000	43.76	<.0001

Parameter	Estimate	Standard Error	t Value	Pr > |t|
Intercept	4.450000000	0.67268120	6.62	<.0001

Dependent Variable: pain6

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	366.0250000	366.0250000	110.82	<.0001
Error	9	29.7250000	3.3027778		
Uncorrected Total	10	395.7500000			

	R-Square	Coeff Var	Root MSE	pain6 Mean
	0.000000	30.03892	1.817355	6.050000

Source	DF	Type I SS	Mean Square	F Value	Pr > F
Intercept	1	366.0250000	366.0250000	110.82	<.0001

Source	DF	Type III SS	Mean Square	F Value	Pr > F
Intercept	1	366.0250000	366.0250000	110.82	<.0001

Parameter	Estimate	Standard Error	t Value	Pr > |t|
Intercept	6.050000000	0.57469799	10.53	<.0001

The GLM Procedure
Repeated Measures Analysis of Variance

Repeated Measures Level Information

Dependent Variable	pain1	pain2	pain3	pain4	pain5	pain6
Level of treatment	1	2	3	4	5	6

MANOVA Test Criteria and Exact F Statistics
for the Hypothesis of no treatment Effect
H = Type III SSCP Matrix for treatment
E = Error SSCP Matrix

S=1   M=1.5   N=1.5

Statistic	Value	F Value	Num DF	Den DF	Pr > F
Wilks' Lambda	0.26024160	2.84	5	5	0.1381
Pillai's Trace	0.73975840	2.84	5	5	0.1381
Hotelling-Lawley Trace	2.84258317	2.84	5	5	0.1381
Roy's Greatest Root	2.84258317	2.84	5	5	0.1381

The GLM Procedure
Repeated Measures Analysis of Variance
Univariate Tests of Hypotheses for Within Subject Effects

Source	DF	Type III SS	Mean Square	F Value	Pr > F
treatment	5	38.37083333	7.67416667	3.76	0.0063
Error(treatment)	45	91.83750000	2.04083333		

	Adj Pr > F	
Source	G - G	H - F
treatment	0.0207	0.0064
Error(treatment)		

Greenhouse-Geisser Epsilon	0.6243
Huynh-Feldt Epsilon	0.9940

                          The GLM Procedure
                 Repeated Measures Analysis of Variance
                 Analysis of Variance of Contrast Variables

treatment_N represents the contrast between the nth level of treatment and the
last

Contrast Variable: treatment_1

Source	DF	Type III SS	Mean Square	F Value	Pr > F
Mean	1	0.22500000	0.22500000	0.04	0.8427
Error	9	48.52500000	5.39166667		

Contrast Variable: treatment_2

Source	DF	Type III SS	Mean Square	F Value	Pr > F
Mean	1	11.02500000	11.02500000	2.94	0.1204
Error	9	33.72500000	3.74722222		

Contrast Variable: treatment_3

Source	DF	Type III SS	Mean Square	F Value	Pr > F
Mean	1	25.60000000	25.60000000	4.57	0.0612
Error	9	50.40000000	5.60000000		

Contrast Variable: treatment_4

Source	DF	Type III SS	Mean Square	F Value	Pr > F
Mean	1	0.62500000	0.62500000	0.11	0.7477
Error	9	51.12500000	5.68055556		

Contrast Variable: treatment_5

Source	DF	Type III SS	Mean Square	F Value	Pr > F
Mean	1	25.60000000	25.60000000	9.07	0.0147
Error	9	25.40000000	2.82222222		

                          The GLM Procedure
                 Repeated Measures Analysis of Variance

                   Means of Within Subjects Effects

         Level of
         treatment   N   Mean   Std Dev

         1   10   6.20000000   1.90321366
         2   10   5.00000000   1.92930615
         3   10   4.45000000   2.62942748
         4   10   6.30000000   1.78263226
         5   10   4.45000000   2.12720474
         6   10   6.05000000   1.81735461