

## Univariate Analysis of Variance: Case $\alpha=1$

### Between-Subjects Factors

		N
n	8	360
	10	360
	12	360
m1	2	540
	4	540
m2	2	540
	3	540
PROBLEM	CO (MA)	360
	MA	360
	PM (MA)	360

### Tests of Between-Subjects Effects

Dependent Variable: TCT

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	1501313080.566 <sup>a</sup>	35	42894659.445	179.837	.000
Intercept	20903405947.934	1	20903405947.934	87638.009	.000
n	1307139439.724	2	653569719.862	2740.106	.000
m1	31556002.668	1	31556002.668	132.299	.000
m2	47920347.245	1	47920347.245	200.907	.000
PROBLEM	89411142.430	2	44705571.215	187.429	.000
n * m1	5327756.169	2	2663878.084	11.168	.000
n * m2	4275952.035	2	2137976.018	8.964	.000
n * PROBLEM	13441566.920	4	3360391.730	14.089	.000
m1 * m2	1588917.245	1	1588917.245	6.662	.010
m1 * PROBLEM	181062.785	2	90531.393	.380	.684
m2 * PROBLEM	126424.896	2	63212.448	.265	.767
n * m1 * m2	151877.613	2	75938.806	.318	.727
n * m1 * PROBLEM	16675.720	4	4168.930	.017	.999
n * m2 * PROBLEM	17616.698	4	4404.175	.018	.999
m1 * m2 * PROBLEM	33808.141	2	16904.070	.071	.932
n * m1 * m2 * PROBLEM	124490.276	4	31122.569	.130	.971
Error	249014738.500	1044	238519.864		
Total	22653733767.000	1080			
Corrected Total	1750327819.066	1079			

a. R Squared = .858 (Adjusted R Squared = .853)

## Post Hoc Tests

n

### Multiple Comparisons

Dependent Variable: TCT

Tukey HSD

(I) n	(J) n	Mean Difference		Sig.	95% Confidence Interval	
		(I-J)	Std. Error		Lower Bound	Upper Bound
8	10	-1319.48*	36.402	.000	-1404.92	-1234.05
	12	-2694.60*	36.402	.000	-2780.03	-2609.16
10	8	1319.48*	36.402	.000	1234.05	1404.92
	12	-1375.11*	36.402	.000	-1460.55	-1289.68
12	8	2694.60*	36.402	.000	2609.16	2780.03
	10	1375.11*	36.402	.000	1289.68	1460.55

Based on observed means.

The error term is Mean Square(Error) = 238519.864.

\*. The mean difference is significant at the 0.05 level.

## Homogeneous Subsets

TCT

Tukey HSD<sup>a,b</sup>

n	N	Subset		
		1	2	3
8	360	3061.41		
10	360		4380.89	
12	360			5756.00
Sig.		1.000	1.000	1.000

Means for groups in homogeneous subsets are displayed.

Based on observed means.

The error term is Mean Square(Error) = 238519.864.

a. Uses Harmonic Mean Sample Size = 360.000.

b. Alpha = 0.05.

## PROBLEM

### Multiple Comparisons

Dependent Variable: TCT

Tukey HSD

(I)	(J)	Mean	Std.		95%	
PROBLEM	PROBLEM	Difference	Error	Sig.	Confidence	
		(I-J)			Interval	
					Lower	
					Bound	
CO (MA)	MA	112.74*	36.402	.006	27.31	
	PM (MA)	-546.13*	36.402	.000	-631.57	
MA	CO (MA)	-112.74*	36.402	.006	-198.18	
	PM (MA)	-658.88*	36.402	.000	-744.32	
PM (MA)	CO (MA)	546.13*	36.402	.000	460.70	
	MA	658.88*	36.402	.000	573.44	

### Homogeneous Subsets

TCT

Tukey HSD<sup>a,b</sup>

PROBLEM	N	Subset		
		1	2	3
MA	360	4142.23		
CO (MA)	360		4254.97	
PM (MA)	360			4801.10
Sig.		1.000	1.000	1.000

Means for groups in homogeneous subsets are displayed.

Based on observed means.

The error term is Mean Square(Error) = 238519.864.

a. Uses Harmonic Mean Sample Size = 360.000.

b. Alpha = 0.05.

## Univariate Analysis of Variance: Case $\alpha=2$

### Between-Subjects Factors

N		
n	8	360
	10	360
	12	360
m1	2	540
	4	540
m2	2	540
	3	540
PROBLEM	CO (MA)	360
	MA	360
	PM (MA)	360

### Tests of Between-Subjects Effects

Dependent Variable: TCT

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	3693149530.063 <sup>a</sup>	35	105518558.002	84.182	.000
Intercept	48087426439.737	1	48087426439.737	38364.050	.000
n	3306548368.113	2	1653274184.056	1318.979	.000
m1	20123922.015	1	20123922.015	16.055	.000
m2	152701120.370	1	152701120.370	121.825	.000
PROBLEM	146664858.180	2	73332429.090	58.504	.000
n * m1	13085280.180	2	6542640.090	5.220	.006
n * m2	7243630.791	2	3621815.395	2.889	.056
n * PROBLEM	28608800.587	4	7152200.147	5.706	.000
m1 * m2	410436.033	1	410436.033	.327	.567
m1 * PROBLEM	498637.035	2	249318.518	.199	.820
m2 * PROBLEM	2024245.146	2	1012122.573	.807	.446
n * m1 * m2	14070062.339	2	7035031.169	5.613	.004
n * m1 * PROBLEM	104984.954	4	26246.238	.021	.999
n * m2 * PROBLEM	627955.843	4	156988.961	.125	.973
m1 * m2 * PROBLEM	274511.617	2	137255.808	.110	.896
n * m1 * m2 * PROBLEM	162716.861	4	40679.215	.032	.998
Error	1308602032.200	1044	1253450.222		
Total	53089178002.000	1080			
Corrected Total	5001751562.263	1079			

a. R Squared = .738 (Adjusted R Squared = .730)

## Post Hoc Tests

n

### Multiple Comparisons

Dependent Variable: TCT

Tukey HSD

(I) n	(J) n	Mean Difference	Std. Error	Sig.	95% Confidence Interval	
		(I-J)			Lower Bound	Upper Bound
8	10	-1957.43*	83.448	.000	-2153.29	-1761.58
	12	-4280.78*	83.448	.000	-4476.64	-4084.92
10	8	1957.43*	83.448	.000	1761.58	2153.29
	12	-2323.35*	83.448	.000	-2519.20	-2127.49
12	8	4280.78*	83.448	.000	4084.92	4476.64
	10	2323.35*	83.448	.000	2127.49	2519.20

Based on observed means.

The error term is Mean Square(Error) = 1253450.222.

\*. The mean difference is significant at the 0.05 level.

## Homogeneous Subsets

TCT

Tukey HSD<sup>a,b</sup>

n	N	Subset		
		1	2	3
8	360	4593.33		
10	360		6550.76	
12	360			8874.11
Sig.		1.000	1.000	1.000

Means for groups in homogeneous subsets are displayed.

Based on observed means.

The error term is Mean Square(Error) = 1253450.222.

a. Uses Harmonic Mean Sample Size = 360.000.

b. Alpha = 0.05.

## PROBLEM

### Multiple Comparisons

Dependent Variable: TCT

Tukey HSD

(I)	(J)	Mean	Std.		95%	
PROBLEM	PROBLEM	Difference	Error	Sig.	Confidence	
		(I-J)			Interval	
					Lower	
					Bound	
CO (MA)	MA	868.29*	83.448	.000	672.43	
	PM (MA)	220.46*	83.448	.023	24.61	
MA	CO (MA)	-868.29*	83.448	.000	-1064.15	
	PM (MA)	-647.82*	83.448	.000	-843.68	
PM (MA)	CO (MA)	-220.46*	83.448	.023	-416.32	
	MA	647.82*	83.448	.000	451.97	

## Homogeneous Subsets

TCT

Tukey HSD<sup>a,b</sup>

PROBLEM	N	Subset		
		1	2	3
MA	360	6167.36		
PM (MA)	360		6815.19	
CO (MA)	360			7035.65
Sig.		1.000	1.000	1.000

Means for groups in homogeneous subsets are displayed.

Based on observed means.

The error term is Mean Square(Error) = 1253450.222.

a. Uses Harmonic Mean Sample Size = 360.000.

b. Alpha = 0.05.

## Univariate Analysis of Variance: Case $\alpha=3$

### Between-Subjects Factors

N		
n	8	360
	10	360
	12	360
m1	2	540
	4	540
m2	2	540
	3	540
PROBLEM	CO (MA)	360
	MA	360
	PM (MA)	360

### Tests of Between-Subjects Effects

Dependent Variable: TCT

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	7698478897.432 <sup>a</sup>	35	219956539.927	71.139	.000
Intercept	92433790369.667	1	92433790369.667	29895.169	.000
n	6731439680.035	2	3365719840.018	1088.550	.000
m1	16455885.156	1	16455885.156	5.322	.021
m2	301840118.712	1	301840118.712	97.622	.000
PROBLEM	463997852.791	2	231998926.395	75.034	.000
n * m1	23189825.113	2	11594912.556	3.750	.024
n * m2	18124581.002	2	9062290.501	2.931	.054
n * PROBLEM	88537214.998	4	22134303.750	7.159	.000
m1 * m2	1023361.134	1	1023361.134	.331	.565
m1 * PROBLEM	924293.124	2	462146.562	.149	.861
m2 * PROBLEM	6173021.624	2	3086510.812	.998	.369
n * m1 * m2	44363418.813	2	22181709.406	7.174	.001
n * m1 * PROBLEM	424735.198	4	106183.800	.034	.998
n * m2 * PROBLEM	984581.254	4	246145.313	.080	.989
m1 * m2 * PROBLEM	848014.002	2	424007.001	.137	.872
n * m1 * m2 * PROBLEM	152314.476	4	38078.619	.012	1.000
Error	3227975663.900	1044	3091930.713		
Total	103360244931.000	1080			
Corrected Total	10926454561.332	1079			

a. R Squared = .705 (Adjusted R Squared = .695)

## Post Hoc Tests

n

### Multiple Comparisons

Dependent Variable: TCT

Tukey HSD

(I) n	(J) n	Mean Difference		Sig.	95% Confidence Interval	
		(I-J)	Std. Error		Lower Bound	Upper Bound
8	10	-2759.12*	131.063	.000	-3066.73	-2451.51
	12	-6105.88*	131.063	.000	-6413.49	-5798.27
10	8	2759.12*	131.063	.000	2451.51	3066.73
	12	-3346.76*	131.063	.000	-3654.37	-3039.15
12	8	6105.88*	131.063	.000	5798.27	6413.49
	10	3346.76*	131.063	.000	3039.15	3654.37

Based on observed means.

The error term is Mean Square(Error) = 3091930.713.

\*. The mean difference is significant at the 0.05 level.

## Homogeneous Subsets

TCT

Tukey HSD<sup>a,b</sup>

n	N	Subset		
		1	2	3
8	360	6296.32		
10	360		9055.43	
12	360			12402.20
Sig.		1.000	1.000	1.000

Means for groups in homogeneous subsets are displayed.

Based on observed means.

The error term is Mean Square(Error) = 3091930.713.

a. Uses Harmonic Mean Sample Size = 360.000.

b. Alpha = 0.05.



## PROBLEM

### Multiple Comparisons

Dependent Variable: TCT

Tukey HSD

(I)	(J)	Mean	Std.		95%	
PROBLEM	PROBLEM	Difference	Error	Sig.	Confidence	
		(I-J)			Interval	
					Lower	
					Bound	
CO (MA)	MA	1578.61*	131.063	.000	1271.00	
	PM (MA)	1042.90*	131.063	.000	735.29	
MA	CO (MA)	-1578.61*	131.063	.000	-1886.22	
	PM (MA)	-535.72*	131.063	.000	-843.33	
PM (MA)	CO (MA)	-1042.90*	131.063	.000	-1350.51	
	MA	535.72*	131.063	.000	228.11	

## Homogeneous Subsets

TCT

Tukey HSD<sup>a,b</sup>

PROBLEM	N	Subset		
		1	2	3
MA	360	8546.54		
PM (MA)	360		9082.26	
CO (MA)	360			10125.15
Sig.		1.000	1.000	1.000

Means for groups in homogeneous subsets are displayed.

Based on observed means.

The error term is Mean Square(Error) = 3091930.713.

a. Uses Harmonic Mean Sample Size = 360.000.

b. Alpha = 0.05.