

```

GLM Vertical_length Horizontal_length Vertical_curve Horizontal_curve Vertical_distance Horizon
/WSFACTOR=visualPrimitives 4 Polynomial Adjustment 2 Polynomial
/METHOD=SSTYPE(3)
/PLOT=PROFILE(vvisualPrimitives*Adjustment)
/EMMEANS=TABLES(vvisualPrimitives) COMPARE ADJ(BONFERRONI)
/EMMEANS=TABLES(Adjustment) COMPARE ADJ(BONFERRONI)
/EMMEANS=TABLES(vvisualPrimitives*Adjustment)
/PRINT=DESCRIPTIVE ETASQ HOMOGENEITY
/CRITERIA=ALPHA(.05)
/WSDESIGN=visualPrimitives Adjustment vvisualPrimitives*Adjustment.

```

## General Linear Model

### Notes

Output Created		01-Sep-2015 18:18:06
Comments		
Input	Active Dataset	DataSet0
	Filter	<none>
	Weight	<none>
	Split File	<none>
	N of Rows in Working Data File	35
Missing Value Handling	Definition of Missing	User-defined missing values are treated as missing.
	Cases Used	Statistics are based on all cases with valid data for all variables in the model.
Syntax		GLM Vertical_length Horizontal_length Vertical_curve Horizontal_curve Vertical_distance Horizontal_Distnace Vertical_position Horizontal_position /WSFACTOR=visualPrimitives 4 Polynomial Adjustment 2 Polynomial /METHOD=SSTYPE(3) /PLOT=PROFILE (visualPrimitives*Adjustment) /EMMEANS=TABLES (visualPrimitives) COMPARE ADJ (BONFERRONI) /EMMEANS=TABLES(Adjustment) COMPARE ADJ(BONFERRONI) /EMMEANS=TABLES (visualPrimitives*Adjustment) /PRINT=DESCRIPTIVE ETASQ HOMOGENEITY /CRITERIA=ALPHA(.05) /WSDESIGN=visualPrimitives Adjustment visualPrimitives*Adjustment.
Resources	Processor Time	00 00:00:00.219
	Elapsed Time	00 00:00:00.259

[DataSet0]

### Warnings

The HOMOGENEITY specification in the PRINT subcommand will be ignored because there are no between-subjects factors.

### Within-Subjects Factors

Measure: MEASURE\_1

visualPrimitives	Adjustment	Dependent Variable
1	1	Vertical_length
	2	Horizontal_length
2	1	Vertical_curve
	2	Horizontal_curve
3	1	Vertical_distance
	2	Horizontal_Distnace
4	1	Vertical_position
	2	Horizontal_position

### Descriptive Statistics

	Mean	Std. Deviation	N
Vertical_length	2.4571	1.03028	35
Horizontal_length	2.4157	1.07964	35
Vertical_curve	3.7560	1.32600	35
Horizontal_curve	3.2883	1.07390	35
Vertical_distance	2.7429	.98893	35
Horizontal_Distnace	3.8269	1.68888	35
Vertical_position	2.3243	.89548	35
Horizontal_position	2.7066	1.01326	35

**Multivariate Tests<sup>b</sup>**

Effect		Value	F	Hypothesis df	Error df
visualPrimitives	Pillai's Trace	.651	19.933 <sup>a</sup>	3.000	32.000
	Wilks' Lambda	.349	19.933 <sup>a</sup>	3.000	32.000
	Hotelling's Trace	1.869	19.933 <sup>a</sup>	3.000	32.000
	Roy's Largest Root	1.869	19.933 <sup>a</sup>	3.000	32.000
Adjustment	Pillai's Trace	.164	6.659 <sup>a</sup>	1.000	34.000
	Wilks' Lambda	.836	6.659 <sup>a</sup>	1.000	34.000
	Hotelling's Trace	.196	6.659 <sup>a</sup>	1.000	34.000
	Roy's Largest Root	.196	6.659 <sup>a</sup>	1.000	34.000
visualPrimitives * Adjustment	Pillai's Trace	.531	12.069 <sup>a</sup>	3.000	32.000
	Wilks' Lambda	.469	12.069 <sup>a</sup>	3.000	32.000
	Hotelling's Trace	1.131	12.069 <sup>a</sup>	3.000	32.000
	Roy's Largest Root	1.131	12.069 <sup>a</sup>	3.000	32.000

**Multivariate Tests<sup>b</sup>**

Effect		Sig.	Partial Eta Squared
visualPrimitives	Pillai's Trace	.000	.651
	Wilks' Lambda	.000	.651
	Hotelling's Trace	.000	.651
	Roy's Largest Root	.000	.651
Adjustment	Pillai's Trace	.014	.164
	Wilks' Lambda	.014	.164
	Hotelling's Trace	.014	.164
	Roy's Largest Root	.014	.164
visualPrimitives * Adjustment	Pillai's Trace	.000	.531
	Wilks' Lambda	.000	.531
	Hotelling's Trace	.000	.531
	Roy's Largest Root	.000	.531

a. Exact statistic

b. Design: Intercept

Within Subjects Design: visualPrimitives + Adjustment + visualPrimitives \* Adjustment

**Mauchly's Test of Sphericity<sup>b</sup>**

Measure: MEASURE\_1

Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.
visualPrimitives	.838	5.794	5	.327
Adjustment	1.000	.000	0	.
visualPrimitives * Adjustment	.761	8.947	5	.111

**Mauchly's Test of Sphericity<sup>b</sup>**

Measure: MEASURE\_1

Within Subjects Effect	Epsilon <sup>a</sup>		
	Greenhouse-Geisser	Huynh-Feldt	Lower-bound
visualPrimitives	.906	.992	.333
Adjustment	1.000	1.000	1.000
visualPrimitives * Adjustment	.859	.936	.333

Tests the null hypothesis that the error covariance matrix of the orthonormalized transformed dependent variables is proportional to an identity matrix.

a. May be used to adjust the degrees of freedom for the averaged tests of significance. Corrected tests are displayed in the Tests of Within-Subjects Effects table.

b. Design: Intercept

Within Subjects Design: visualPrimitives + Adjustment + visualPrimitives \* Adjustment

### Tests of Within-Subjects Effects

Measure: MEASURE\_1

Source		Type III Sum of Squares	df	Mean Square	F
visualPrimitives	Sphericity Assumed	62.416	3	20.805	23.865
	Greenhouse-Geisser	62.416	2.717	22.972	23.865
	Huynh-Feldt	62.416	2.976	20.973	23.865
	Lower-bound	62.416	1.000	62.416	23.865
Error(visualPrimitives)	Sphericity Assumed	88.925	102	.872	
	Greenhouse-Geisser	88.925	92.382	.963	
	Huynh-Feldt	88.925	101.185	.879	
	Lower-bound	88.925	34.000	2.615	
Adjustment	Sphericity Assumed	4.008	1	4.008	6.659
	Greenhouse-Geisser	4.008	1.000	4.008	6.659
	Huynh-Feldt	4.008	1.000	4.008	6.659
	Lower-bound	4.008	1.000	4.008	6.659
Error(Adjustment)	Sphericity Assumed	20.466	34	.602	
	Greenhouse-Geisser	20.466	34.000	.602	
	Huynh-Feldt	20.466	34.000	.602	
	Lower-bound	20.466	34.000	.602	
visualPrimitives * Adjustment	Sphericity Assumed	22.971	3	7.657	17.259
	Greenhouse-Geisser	22.971	2.578	8.912	17.259
	Huynh-Feldt	22.971	2.807	8.182	17.259
	Lower-bound	22.971	1.000	22.971	17.259
Error(visual Primitives*Adjustment)	Sphericity Assumed	45.253	102	.444	
	Greenhouse-Geisser	45.253	87.637	.516	
	Huynh-Feldt	45.253	95.451	.474	
	Lower-bound	45.253	34.000	1.331	

### Tests of Within-Subjects Effects

Measure: MEASURE\_1

Source		Sig.	Partial Eta Squared
visualPrimitives	Sphericity Assumed	.000	.412
	Greenhouse-Geisser	.000	.412
	Huynh-Feldt	.000	.412
	Lower-bound	.000	.412
Adjustment	Sphericity Assumed	.014	.164
	Greenhouse-Geisser	.014	.164
	Huynh-Feldt	.014	.164
	Lower-bound	.014	.164
visualPrimitives * Adjustment	Sphericity Assumed	.000	.337
	Greenhouse-Geisser	.000	.337
	Huynh-Feldt	.000	.337
	Lower-bound	.000	.337

### Tests of Within-Subjects Contrasts

Measure: MEASURE\_1

Source		Adjustment	Type III Sum of Squares	df	Mean Square
visualPrimitives	Linear		2.857E-7	1	2.857E-7
	Quadratic		60.227	1	60.227
	Cubic		2.189	1	2.189
Error(visualPrimitives)	Linear		32.517	34	.956
	Quadratic		35.300	34	1.038
	Cubic		21.107	34	.621
Adjustment	Linear		4.008	1	4.008
Error(Adjustment)	Linear		20.466	34	.602
visualPrimitives * Adjustment	Linear	Linear	6.972	1	6.972
	Quadratic	Linear	.332	1	.332
	Cubic	Linear	15.667	1	15.667
Error(visual Primitives*Adjustment)	Linear	Linear	9.700	34	.285
	Quadratic	Linear	15.920	34	.468
	Cubic	Linear	19.633	34	.577

### Tests of Within-Subjects Contrasts

Measure: MEASURE\_1

Source	Adjustment	F	Sig.	Partial Eta Squared
visualPrimitives	Linear	.000	1.000	.000
	Quadratic	58.009	.000	.630
	Cubic	3.526	.069	.094
Adjustment	Linear	6.659	.014	.164
visualPrimitives * Adjustment	Linear Linear	24.440	.000	.418
	Quadratic Linear	.709	.406	.020
	Cubic Linear	27.132	.000	.444

### Tests of Between-Subjects Effects

Measure: MEASURE\_1

Transformed Variable: Average

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Intercept	2419.738	1	2419.738	387.208	.000	.919
Error	212.472	34	6.249			

## Estimated Marginal Means

### 1. visualPrimitives

#### Estimates

Measure: MEASURE\_1

visualPrimitives	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
1	2.436	.164	2.103	2.770
2	3.522	.181	3.155	3.889
3	3.285	.213	2.853	3.717
4	2.515	.148	2.215	2.816

### Pairwise Comparisons

Measure: MEASURE\_1

(I) visualPrimitives	(J) visualPrimitives	Mean Difference (I-J)	Std. Error	Sig. <sup>a</sup>
1	2	-1.086 <sup>*</sup>	.151	.000
	3	-.848 <sup>*</sup>	.185	.000
	4	-.079	.150	1.000
2	1	1.086 <sup>*</sup>	.151	.000
	3	.237	.150	.736
	4	1.007 <sup>*</sup>	.161	.000
3	1	.848 <sup>*</sup>	.185	.000
	2	-.237	.150	.736
	4	.769 <sup>*</sup>	.147	.000
4	1	.079	.150	1.000
	2	-1.007 <sup>*</sup>	.161	.000
	3	-.769 <sup>*</sup>	.147	.000

### Pairwise Comparisons

Measure: MEASURE\_1

(I) visualPrimitives	(J) visualPrimitives	95% Confidence Interval for Difference <sup>a</sup>	
		Lower Bound	Upper Bound
1	2	-1.509	-.663
	3	-1.366	-.330
	4	-.500	.342
2	1	.663	1.509
	3	-.183	.657
	4	.556	1.458
3	1	.330	1.366
	2	-.657	.183
	4	.359	1.180
4	1	-.342	.500
	2	-1.458	-.556
	3	-1.180	-.359

Based on estimated marginal means

\*. The mean difference is significant at the .05 level.

a. Adjustment for multiple comparisons: Bonferroni.



### Multivariate Tests

	Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared
Pillai's trace	.651	19.933 <sup>a</sup>	3.000	32.000	.000	.651
Wilks' lambda	.349	19.933 <sup>a</sup>	3.000	32.000	.000	.651
Hotelling's trace	1.869	19.933 <sup>a</sup>	3.000	32.000	.000	.651
Roy's largest root	1.869	19.933 <sup>a</sup>	3.000	32.000	.000	.651

Each F tests the multivariate effect of visualPrimitives. These tests are based on the linearly independent pairwise comparisons among the estimated marginal means.

a. Exact statistic

## 2. Adjustment

### Estimates

Measure:MEASURE\_1

Adjustment	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
1	2.820	.145	2.526	3.114
2	3.059	.167	2.719	3.399

### Pairwise Comparisons

Measure:MEASURE\_1

(I) Adjustment	(J) Adjustment	Mean Difference (I-J)	Std. Error	Sig. <sup>a</sup>	95% Confidence Interval for Difference <sup>a</sup>	
					Lower Bound	Upper Bound
1	2	-.239	.093	.014	-.428	-.051
2	1	.239	.093	.014	.051	.428

Based on estimated marginal means

\*. The mean difference is significant at the .05 level.

a. Adjustment for multiple comparisons: Bonferroni.

### Multivariate Tests

	Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared
Pillai's trace	.164	6.659 <sup>a</sup>	1.000	34.000	.014	.164
Wilks' lambda	.836	6.659 <sup>a</sup>	1.000	34.000	.014	.164
Hotelling's trace	.196	6.659 <sup>a</sup>	1.000	34.000	.014	.164
Roy's largest root	.196	6.659 <sup>a</sup>	1.000	34.000	.014	.164

Each F tests the multivariate effect of Adjustment. These tests are based on the linearly independent pairwise comparisons among the estimated marginal means.

a. Exact statistic

### 3. visualPrimitives \* Adjustment

Measure: MEASURE\_1

visualPrimitives	Adjustment	Mean	Std. Error	95% Confidence Interval	
				Lower Bound	Upper Bound
1	1	2.457	.174	2.103	2.811
	2	2.416	.182	2.045	2.787
2	1	3.756	.224	3.301	4.211
	2	3.288	.182	2.919	3.657
3	1	2.743	.167	2.403	3.083
	2	3.827	.285	3.247	4.407
4	1	2.324	.151	2.017	2.632
	2	2.707	.171	2.359	3.055

### Profile Plots

