Table 25-6 Two-Factor Repeated Measures ANOVA: Elbow Flexor Strength in Three Forearm Positions and Two Elbow Positions

Note: Error in text, Table 25-6 (3), p.379, under Tests of Between Subject Effects, shown highlighted in output below.

```
GLM pronfl neutfl supinfl pronext neutext supext
  /WSFACTOR=elbow 2 Repeated forearm 3 Repeated
  /MEASURE=strength
  /METHOD=SSTYPE(3)
  /PLOT=PROFILE(forearm*elbow) TYPE=LINE ERRORBAR=NO MEANREFERENCE=NO YAXIS=AUTO
  /EMMEANS=TABLES(elbow) COMPARE ADJ(LSD)
  /EMMEANS=TABLES(forearm) COMPARE ADJ(LSD)
  /EMMEANS=TABLES(elbow*forearm)
  /PRINT=DESCRIPTIVE ETASQ OPOWER
  /CRITERIA=ALPHA(.05)
  /WSDESIGN=elbow forearm elbow*forearm.
```

General Linear Model

Within-Subjects Factors

Measure: strength

elbow	forearm	Dependent Variable
1	1	pronfl
	2	neutfl
	3	supinfl
2	1	pronext
	2	neutext
	3	supext

Descriptive Statistics

	Mean	Std. Deviation	N
pronfl	17.3750	10.84880	8
neutfl	28.1250	10.98619	8
supinfl	30.2500	11.56040	8
pronext	25.0000	19.13859	8
neutext	33.0000	9.08688	8
supext	34.3750	8.14051	8

Multivariate Tests[a]

Effect		Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared	Noncent. Parameter	Observed Power[c]
elbow	Pillai's Trace	.137	1.112[b]	1.000	7.000	.137	1.112	.150	.150
	Wilks' Lambda	.863	1.112[b]	1.000	7.000	.137	1.112	.150	.150
	Hotelling's Trace	.159	1.112[b]	1.000	7.000	.137	1.112	.150	.150
	Roy's Largest Root	.159	1.112[b]	1.000	7.000	.137	1.112	.150	.150
forearm	Pillai's Trace	.699	6.963[b]	2.000	6.000	.699	13.926	.727	.727
	Wilks' Lambda	.301	6.963[b]	2.000	6.000	.699	13.926	.727	.727
	Hotelling's Trace	2.321	6.963[b]	2.000	6.000	.699	13.926	.727	.727
	Roy's Largest Root	2.321	6.963[b]	2.000	6.000	.699	13.926	.727	.727
elbow * forearm	Pillai's Trace	.027	.084[b]	2.000	6.000	.027	.167	.058	.058
	Wilks' Lambda	.973	.084[b]	2.000	6.000	.027	.167	.058	.058
	Hotelling's Trace	.028	.084[b]	2.000	6.000	.027	.167	.058	.058
	Roy's Largest Root	.028	.084[b]	2.000	6.000	.027	.167	.058	.058

a. Design: Intercept

Within Subjects Design: elbow + forearm + elbow * forearm

b. Exact statistic

c. Computed using alpha = .05

Mauchly's Test of Sphericity[a]

Measure: strength

Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.	Epsilon[b] Greenhouse-Geisser	Epsilon[b] Huynh-Feldt	Epsilon[b] Lower-bound
elbow	1.000	.000	0	.	1.000	1.000	1.000
forearm	.361	6.120	2	.047	.610	.671	.500
elbow * forearm	.464	4.606	2	.100	.651	.739	.500

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

a. Design: Intercept

Within Subjects Design: elbow + forearm + elbow * forearm

b. 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.

Tests of Within-Subjects Effects

Measure: strength

Source		Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared	Noncent. Parameter	Observed Power[a]
elbow	Sphericity Assumed	368.521	1	368.521	1.112	.327	.137	1.112	.150
	Greenhouse-Geisser	368.521	1.000	368.521	1.112	.327	.137	1.112	.150
	Huynh-Feldt	368.521	1.000	368.521	1.112	.327	.137	1.112	.150
	Lower-bound	368.521	1.000	368.521	1.112	.327	.137	1.112	.150
Error(elbow)	Sphericity Assumed	2319.979	7	331.426					
	Greenhouse-Geisser	2319.979	7.000	331.426					
	Huynh-Feldt	2319.979	7.000	331.426					
	Lower-bound	2319.979	7.000	331.426					
forearm	Sphericity Assumed	1145.167	2	572.583	6.074	.013	.465	12.147	.804
	Greenhouse-Geisser	1145.167	1.220	938.701	6.074	.033	.465	7.410	.632
	Huynh-Feldt	1145.167	1.342	853.025	6.074	.028	.465	8.154	.665
	Lower-bound	1145.167	1.000	1145.167	6.074	.043	.465	6.074	.564
Error(forearm)	Sphericity Assumed	1319.833	14	94.274					
	Greenhouse-Geisser	1319.833	8.540	154.554					
	Huynh-Feldt	1319.833	9.397	140.448					
	Lower-bound	1319.833	7.000	188.548					
elbow * forearm	Sphericity Assumed	27.167	2	13.583	.120	.888	.017	.240	.065
	Greenhouse-Geisser	27.167	1.302	20.862	.120	.801	.017	.156	.062
	Huynh-Feldt	27.167	1.477	18.389	.120	.829	.017	.177	.063
	Lower-bound	27.167	1.000	27.167	.120	.739	.017	.120	.060
Error(elbow* forearm)	Sphericity Assumed	1587.833	14	113.417					
	Greenhouse-Geisser	1587.833	9.115	174.194					
	Huynh-Feldt	1587.833	10.341	153.544					
	Lower-bound	1587.833	7.000	226.833					

a. Computed using alpha = .05

Tests of Within-Subjects Contrasts

Measure: strength

Source	elbow	forearm	Type III Sum of Squares	df	Mean Square	F	Sig.
elbow	Level 1 vs. Level 2		245.681	1	245.681	1.112	.327
Error(elbow)	Level 1 vs. Level 2		1546.653	7	220.950		
forearm		Level 1 vs. Level 2	703.125	1	703.125	4.358	.075
		Level 2 vs. Level 3	24.500	1	24.500	.792	.403
Error(forearm)		Level 1 vs. Level 2	1129.375	7	161.339		
		Level 2 vs. Level 3	216.500	7	30.929		
elbow * forearm	Level 1 vs. Level 2	Level 1 vs. Level 2	60.500	1	60.500	.092	.771
		Level 2 vs. Level 3	4.500	1	4.500	.036	.855
Error(elbow*forearm)	Level 1 vs. Level 2	Level 1 vs. Level 2	4617.500	7	659.643		
		Level 2 vs. Level 3	875.500	7	125.071		

Tests of Within-Subjects Contrasts (Continued)

Measure: strength

Source	elbow	forearm	Partial Eta Squared	Noncent. Parameter	Observed Power[a]
elbow	Level 1 vs. Level 2		.137	1.112	.150
Error(elbow)	Level 1 vs. Level 2				
forearm		Level 1 vs. Level 2	.384	4.358	.437
		Level 2 vs. Level 3	.102	.792	.121
Error(forearm)		Level 1 vs. Level 2			
		Level 2 vs. Level 3			
elbow * forearm	Level 1 vs. Level 2	Level 1 vs. Level 2	.013	.092	.058
		Level 2 vs. Level 3	.005	.036	.053
Error(elbow*forearm)	Level 1 vs. Level 2	Level 1 vs. Level 2			
		Level 2 vs. Level 3			

a. Computed using alpha = .05

Tests of Between-Subjects Effects

Measure: strength

Transformed Variable: Average

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared	Noncent. Parameter	Observed Power[a]
Intercept	**6281.337**	1	**6281.337**	268.521	.000	.975	268.521	1.000
Error	**163.747**	7	**23.392**					

a. Computed using alpha = .05

This analysis was run with Contrasts>Repeated. In the text, incorrect results for Sum of Squares and Mean Square were generated using Contrasts>Polynomial. These are the correct values.

Estimated Marginal Means

1. elbow

Estimates

Measure: strength

elbow	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
1	25.250	3.881	16.073	34.427
2	30.792	2.144	25.723	35.860

Pairwise Comparisons

Measure: strength

(I) elbow	(J) elbow	Mean Difference (I-J)	Std. Error	Sig.[a]	95% Confidence Interval for Difference[a]	
					Lower Bound	Upper Bound
1	2	-5.542	5.255	.327	-17.969	6.885
2	1	5.542	5.255	.327	-6.885	17.969

Based on estimated marginal means

a. Adjustment for multiple comparisons: Least Significant Difference (equivalent to no adjustments).

Multivariate Tests

	Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared	Noncent. Parameter	Observed Power[b]
Pillai's trace	.137	1.112[a]	1.000	7.000	.327	.137	1.112	.150
Wilks' lambda	.863	1.112[a]	1.000	7.000	.327	.137	1.112	.150
Hotelling's trace	.159	1.112[a]	1.000	7.000	.327	.137	1.112	.150
Roy's largest root	.159	1.112[a]	1.000	7.000	.327	.137	1.112	.150

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

a. Exact statistic

b. Computed using alpha = .05

2. forearm

Estimates

Measure: strength

forearm	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
1	21.188	3.420	13.101	29.274
2	30.563	2.643	24.313	36.812
3	32.313	1.369	29.075	35.550

Pairwise Comparisons

Measure: strength

(I) forearm	(J) forearm	Mean Difference (I-J)	Std. Error	Sig.[b]	95% Confidence Interval for Difference[b]	
					Lower Bound	Upper Bound
1	2	-9.375	4.491	.075	-19.994	1.244
	3	-11.125*	3.364	.013	-19.081	-3.169
2	1	9.375	4.491	.075	-1.244	19.994
	3	-1.750	1.966	.403	-6.399	2.899
3	1	11.125*	3.364	.013	3.169	19.081
	2	1.750	1.966	.403	-2.899	6.399

Based on estimated marginal means

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

b. Adjustment for multiple comparisons: Least Significant Difference (equivalent to no adjustments).

Multivariate Tests

	Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared	Noncent. Parameter	Observed Power[b]
Pillai's trace	.699	6.963[a]	2.000	6.000	.027	.699	13.926	.727
Wilks' lambda	.301	6.963[a]	2.000	6.000	.027	.699	13.926	.727
Hotelling's trace	2.321	6.963[a]	2.000	6.000	.027	.699	13.926	.727
Roy's largest root	2.321	6.963[a]	2.000	6.000	.027	.699	13.926	.727

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

a. Exact statistic

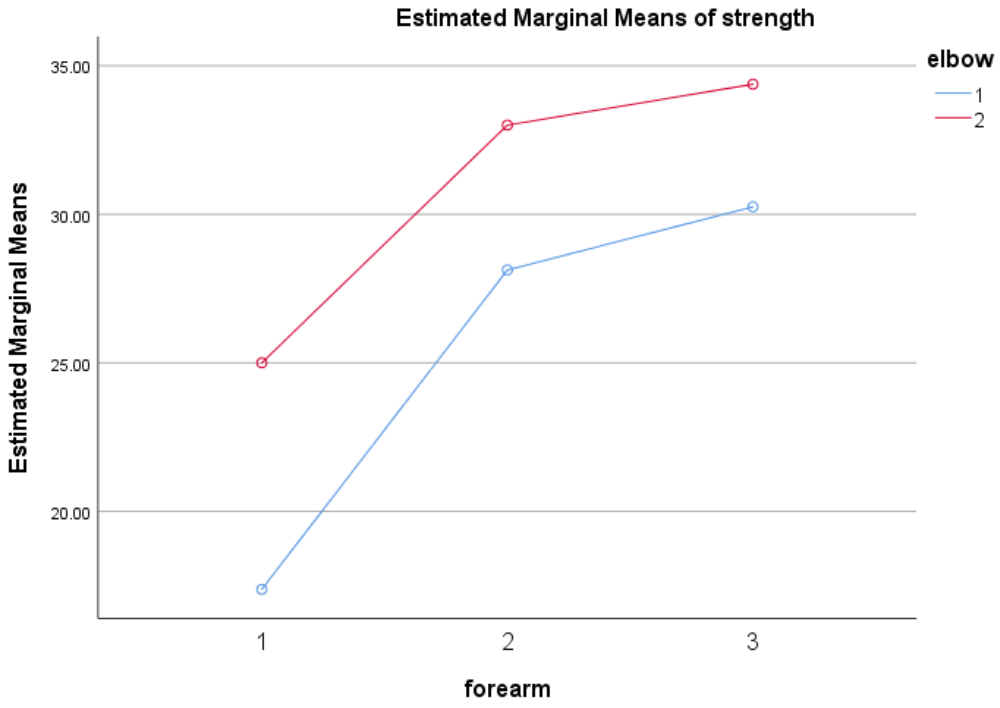
b. Computed using alpha = .05

3. elbow * forearm

Measure: strength

elbow	forearm	Mean	Std. Error	95% Confidence Interval	
				Lower Bound	Upper Bound
1	1	17.375	3.836	8.305	26.445
	2	28.125	3.884	18.940	37.310
	3	30.250	4.087	20.585	39.915
2	1	25.000	6.767	9.000	41.000
	2	33.000	3.213	25.403	40.597
	3	34.375	2.878	27.569	41.181

Profile Plots

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DATASET ACTIVATE DataSet3.
DATASET CLOSE DataSet2.
DATASET ACTIVATE DataSet6.
DATASET CLOSE DataSet3.
```