General Linear Model

Mauchly's Test of Sphericity[a]

Measure: Er

Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.	Epsilon[b] Greenhouse-Geisser
Cursor	.884	3.165	5	.675	.921
Amp	.907	2.548	2	.280	.915
Width	.354	27.026	2	<.001	.607
Cursor * Amp	.417	21.644	20	.364	.752
Cursor * Width	.699	8.887	20	.984	.898
Amp * Width	.709	8.752	9	.461	.846
Cursor * Amp * Width	.008	108.778	77	.014	.579

Mauchly's Test of Sphericity[a]

Measure: Er

Within Subjects Effect	Epsilon[b] Huynh-Feldt	Lower-bound
Cursor	1.000	.333
Amp	.978	.500
Width	.621	.500
Cursor * Amp	.922	.167
Cursor * Width	1.000	.167
Amp * Width	.981	.250
Cursor * Amp * Width	.801	.083

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

a. Design: Intercept
Within Subjects Design: Cursor + Amp + Width + Cursor * Amp + Cursor * Width + Amp * Width + Cursor * Amp * Width

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: Er

Source		Type III Sum of Squares	df	Mean Square
Cursor	Sphericity Assumed	.223	3	.074
	Greenhouse-Geisser	.223	2.764	.081
	Huynh-Feldt	.223	3.000	.074
	Lower-bound	.223	1.000	.223
Error(Cursor)	Sphericity Assumed	.704	81	.009
	Greenhouse-Geisser	.704	74.628	.009
	Huynh-Feldt	.704	81.000	.009
	Lower-bound	.704	27.000	.026
Amp	Sphericity Assumed	1.063	2	.532
	Greenhouse-Geisser	1.063	1.829	.581
	Huynh-Feldt	1.063	1.955	.544
	Lower-bound	1.063	1.000	1.063
Error(Amp)	Sphericity Assumed	.514	54	.010
	Greenhouse-Geisser	.514	49.390	.010
	Huynh-Feldt	.514	52.796	.010
	Lower-bound	.514	27.000	.019
Width	Sphericity Assumed	1.626	2	.813
	Greenhouse-Geisser	1.626	1.215	1.338
	Huynh-Feldt	1.626	1.242	1.309
	Lower-bound	1.626	1.000	1.626
Error(Width)	Sphericity Assumed	.772	54	.014
	Greenhouse-Geisser	.772	32.800	.024
	Huynh-Feldt	.772	33.523	.023
	Lower-bound	.772	27.000	.029
Cursor * Amp	Sphericity Assumed	.095	6	.016
	Greenhouse-Geisser	.095	4.514	.021
	Huynh-Feldt	.095	5.532	.017
	Lower-bound	.095	1.000	.095
Error(Cursor*Amp)	Sphericity Assumed	.756	162	.005
	Greenhouse-Geisser	.756	121.877	.006
	Huynh-Feldt	.756	149.362	.005
	Lower-bound	.756	27.000	.028
Cursor * Width	Sphericity Assumed	.172	6	.029
	Greenhouse-Geisser	.172	5.386	.032
	Huynh-Feldt	.172	6.000	.029
	Lower-bound	.172	1.000	.172
Error(Cursor*Width)	Sphericity Assumed	.697	162	.004
	Greenhouse-Geisser	.697	145.429	.005
	Huynh-Feldt	.697	162.000	.004
	Lower-bound	.697	27.000	.026

Tests of Within-Subjects Effects

Measure: Er

Source		F	Sig.	Partial Eta Squared
Cursor	Sphericity Assumed	8.536	<.001	.240
	Greenhouse-Geisser	8.536	<.001	.240
	Huynh-Feldt	8.536	<.001	.240
	Lower-bound	8.536	.007	.240
Error(Cursor)	Sphericity Assumed			
	Greenhouse-Geisser			
	Huynh-Feldt			
	Lower-bound			
Amp	Sphericity Assumed	55.837	<.001	.674
	Greenhouse-Geisser	55.837	<.001	.674
	Huynh-Feldt	55.837	<.001	.674
	Lower-bound	55.837	<.001	.674
Error(Amp)	Sphericity Assumed			
	Greenhouse-Geisser			
	Huynh-Feldt			
	Lower-bound			
Width	Sphericity Assumed	56.852	<.001	.678
	Greenhouse-Geisser	56.852	<.001	.678
	Huynh-Feldt	56.852	<.001	.678
	Lower-bound	56.852	<.001	.678
Error(Width)	Sphericity Assumed			
	Greenhouse-Geisser			
	Huynh-Feldt			
	Lower-bound			
Cursor * Amp	Sphericity Assumed	3.380	.004	.111
	Greenhouse-Geisser	3.380	.009	.111
	Huynh-Feldt	3.380	.005	.111
	Lower-bound	3.380	.077	.111
Error(Cursor*Amp)	Sphericity Assumed			
	Greenhouse-Geisser			
	Huynh-Feldt			
	Lower-bound			
Cursor * Width	Sphericity Assumed	6.663	<.001	.198
	Greenhouse-Geisser	6.663	<.001	.198
	Huynh-Feldt	6.663	<.001	.198
	Lower-bound	6.663	.016	.198
Error(Cursor*Width)	Sphericity Assumed			
	Greenhouse-Geisser			
	Huynh-Feldt			
	Lower-bound			

Tests of Within-Subjects Effects

Measure: Er

Source		Type III Sum of Squares	df	Mean Square
Amp * Width	Sphericity Assumed	.283	4	.071
	Greenhouse-Geisser	.283	3.383	.084
	Huynh-Feldt	.283	3.926	.072
	Lower-bound	.283	1.000	.283
Error(Amp*Width)	Sphericity Assumed	.520	108	.005
	Greenhouse-Geisser	.520	91.336	.006
	Huynh-Feldt	.520	106.000	.005
	Lower-bound	.520	27.000	.019
Cursor * Amp * Width	Sphericity Assumed	.063	12	.005
	Greenhouse-Geisser	.063	6.954	.009
	Huynh-Feldt	.063	9.613	.007
	Lower-bound	.063	1.000	.063
Error(Cursor*Amp*Width)	Sphericity Assumed	1.581	324	.005
	Greenhouse-Geisser	1.581	187.755	.008
	Huynh-Feldt	1.581	259.559	.006
	Lower-bound	1.581	27.000	.059

Tests of Within-Subjects Effects

Measure: Er

Source		F	Sig.	Partial Eta Squared
Amp * Width	Sphericity Assumed	14.702	<.001	.353
	Greenhouse-Geisser	14.702	<.001	.353
	Huynh-Feldt	14.702	<.001	.353
	Lower-bound	14.702	<.001	.353
Error(Amp*Width)	Sphericity Assumed			
	Greenhouse-Geisser			
	Huynh-Feldt			
	Lower-bound			
Cursor * Amp * Width	Sphericity Assumed	1.082	.374	.039
	Greenhouse-Geisser	1.082	.376	.039
	Huynh-Feldt	1.082	.376	.039
	Lower-bound	1.082	.307	.039
Error(Cursor*Amp*Width)	Sphericity Assumed			
	Greenhouse-Geisser			
	Huynh-Feldt			
	Lower-bound			

Estimated Marginal Means

1. Grand Mean

Measure: Er

Mean	Std. Error	95% Confidence Interval	
		Lower Bound	Upper Bound
.115	.012	.090	.139

2. Cursor

Estimates

Measure: Er

Cursor	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
1	.140	.013	.113	.166
2	.105	.012	.080	.130
3	.103	.013	.077	.129
4	.111	.014	.082	.139

Pairwise Comparisons

Measure: Er

(I) Cursor	(J) Cursor	Mean Difference (I-J)	Std. Error	Sig.[b]	95% Confidence Interval for Difference[b]	
					Lower Bound	Upper Bound
1	2	.035*	.010	.009	.007	.062
	3	.037*	.009	.001	.012	.062
	4	.029*	.008	.008	.006	.053
2	1	-.035*	.010	.009	-.062	-.007
	3	.003	.008	1.000	-.020	.025
	4	-.005	.008	1.000	-.028	.017
3	1	-.037*	.009	.001	-.062	-.012
	2	-.003	.008	1.000	-.025	.020
	4	-.008	.007	1.000	-.028	.012
4	1	-.029*	.008	.008	-.053	-.006
	2	.005	.008	1.000	-.017	.028
	3	.008	.007	1.000	-.012	.028

Based on estimated marginal means

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

b. Adjustment for multiple comparisons: Bonferroni.

3. Amp

Estimates

Measure: Er

Amp	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
1	.071	.009	.053	.088
2	.126	.013	.098	.153
3	.148	.015	.117	.179

Pairwise Comparisons

Measure: Er

(I) Amp	(J) Amp	Mean Difference (I-J)	Std. Error	Sig.[b]	95% Confidence Interval for Difference[b]	
					Lower Bound	Upper Bound
1	2	-.055*	.007	<.001	-.072	-.038
	3	-.077*	.009	<.001	-.099	-.056
2	1	.055*	.007	<.001	.038	.072
	3	-.022*	.007	.017	-.041	-.003
3	1	.077*	.009	<.001	.056	.099
	2	.022*	.007	.017	.003	.041

Based on estimated marginal means

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

b. Adjustment for multiple comparisons: Bonferroni.

4. Width

Estimates

Measure: Er

Width	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
1	.165	.018	.129	.201
2	.112	.012	.087	.137
3	.067	.007	.052	.081

Pairwise Comparisons

Measure: Er

(I) Width	(J) Width	Mean Difference (I-J)	Std. Error	Sig.[b]	95% Confidence Interval for Difference[b]	
					Lower Bound	Upper Bound
1	2	.053*	.007	<.001	.034	.072
	3	.098*	.012	<.001	.067	.130
2	1	-.053*	.007	<.001	-.072	-.034
	3	.046*	.007	<.001	.028	.063
3	1	-.098*	.012	<.001	-.130	-.067
	2	-.046*	.007	<.001	-.063	-.028

Based on estimated marginal means

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

b. Adjustment for multiple comparisons: Bonferroni.

5. Cursor * Amp

Pairwise Comparisons

Measure: Er

Amp	(I) Cursor	(J) Cursor	Mean Difference (I-J)	Std. Error	Sig.[b]	95% Confidence Interval for [b]...
						Lower Bound
1	1	2	.021	.010	.305	-.008
		3	.001	.009	1.000	-.024
		4	.004	.012	1.000	-.030
	2	1	-.021	.010	.305	-.051
		3	-.020	.009	.200	-.046
		4	-.018	.010	.566	-.047
	3	1	-.001	.009	1.000	-.026
		2	.020	.009	.200	-.005
		4	.002	.009	1.000	-.023
	4	1	-.004	.012	1.000	-.037
		2	.018	.010	.566	-.011
		3	-.002	.009	1.000	-.027
2	1	2	.038*	.013	.033	.002
		3	.049*	.013	.006	.011
		4	.039*	.011	.011	.007
	2	1	-.038*	.013	.033	-.074
		3	.011	.011	1.000	-.020
		4	.001	.011	1.000	-.031
	3	1	-.049*	.013	.006	-.086
		2	-.011	.011	1.000	-.041
		4	-.009	.011	1.000	-.042

Pairwise Comparisons

Measure: Er

Amp	(I) Cursor	(J) Cursor	95% Confidence Interval for [b]... Upper Bound
1	1	2	.051
		3	.026
		4	.037
	2	1	.008
		3	.005
		4	.011
	3	1	.024
		2	.046
		4	.027
	4	1	.030
		2	.047
		3	.023
2	1	2	.074
		3	.086
		4	.071
	2	1	-.002
		3	.041
		4	.034
	3	1	-.011
		2	.020
		4	.023

Pairwise Comparisons

Measure: Er

Amp	(I) Cursor	(J) Cursor	Mean Difference (I-J)	Std. Error	Sig.[b]	95% Confidence Interval for [b]... Lower Bound
	4	1	-.039*	.011	.011	-.071
		2	-.001	.011	1.000	-.034
		3	.009	.011	1.000	-.023
3	1	2	.045	.016	.067	-.002
		3	.062*	.015	.002	.019
		4	.045*	.016	.044	.001
	2	1	-.045	.016	.067	-.091
		3	.017	.013	1.000	-.020
		4	.001	.010	1.000	-.029
	3	1	-.062*	.015	.002	-.104
		2	-.017	.013	1.000	-.054
		4	-.016	.012	1.000	-.050
	4	1	-.045*	.016	.044	-.090
		2	-.001	.010	1.000	-.031
		3	.016	.012	1.000	-.018

Pairwise Comparisons

Measure: Er

Amp	(I) Cursor	(J) Cursor	95% Confidence Interval for [b]... Upper Bound
	4	1	-.007
		2	.031
		3	.042
3	1	2	.091
		3	.104
		4	.090
	2	1	.002
		3	.054
		4	.031
	3	1	-.019
		2	.020
		4	.018
	4	1	-.001
		2	.029
		3	.050

Based on estimated marginal means

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

b. Adjustment for multiple comparisons: Bonferroni.

7. Cursor * Width

Pairwise Comparisons

Measure: Er

Width	(I) Cursor	(J) Cursor	Mean Difference (I-J)	Std. Error	Sig.[b]	95% Confidence Interval for [b]... Lower Bound
1	1	2	.078*	.013	<.001	.041
		3	.071*	.013	<.001	.034
		4	.068*	.013	<.001	.031
	2	1	-.078*	.013	<.001	-.116
		3	-.007	.011	1.000	-.037
		4	-.010	.012	1.000	-.045
	3	1	-.071*	.013	<.001	-.108
		2	.007	.011	1.000	-.023
		4	-.003	.014	1.000	-.044
	4	1	-.068*	.013	<.001	-.105
		2	.010	.012	1.000	-.024
		3	.003	.014	1.000	-.038
2	1	2	.026	.015	.519	-.016
		3	.035	.013	.060	-.001
		4	.022	.011	.291	-.008
	2	1	-.026	.015	.519	-.068
		3	.009	.013	1.000	-.028
		4	-.004	.013	1.000	-.041
	3	1	-.035	.013	.060	-.070
		2	-.009	.013	1.000	-.045
		4	-.013	.011	1.000	-.045
	4	1	-.022	.011	.291	-.052
		2	.004	.013	1.000	-.032
		3	.013	.011	1.000	-.019
3	1	2	-.001	.010	1.000	-.031
		3	.005	.009	1.000	-.021
		4	-.002	.010	1.000	-.030
	2	1	.001	.010	1.000	-.029
		3	.006	.011	1.000	-.024
		4	-.001	.009	1.000	-.027
	3	1	-.005	.009	1.000	-.032
		2	-.006	.011	1.000	-.036
		4	-.007	.007	1.000	-.028
	4	1	.002	.010	1.000	-.027
		2	.001	.009	1.000	-.025
		3	.007	.007	1.000	-.014

Pairwise Comparisons

Measure: Er

Width	(I) Cursor	(J) Cursor	95% Confidence Interval for [b]... Upper Bound
1	1	2	.116
		3	.108
		4	.105
	2	1	-.041
		3	.023
		4	.024
	3	1	-.034
		2	.037
		4	.038
	4	1	-.031
		2	.045
		3	.044
2	1	2	.068
		3	.070
		4	.052
	2	1	.016
		3	.045
		4	.032
	3	1	.001
		2	.028
		4	.019
	4	1	.008
		2	.041
		3	.045
3	1	2	.029
		3	.032
		4	.027
	2	1	.031
		3	.036
		4	.025
	3	1	.021
		2	.024
		4	.014
	4	1	.030
		2	.027
		3	.028

Based on estimated marginal means

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

b. Adjustment for multiple comparisons: Bonferroni.

9. Amp * Width

Pairwise Comparisons

Measure: Er

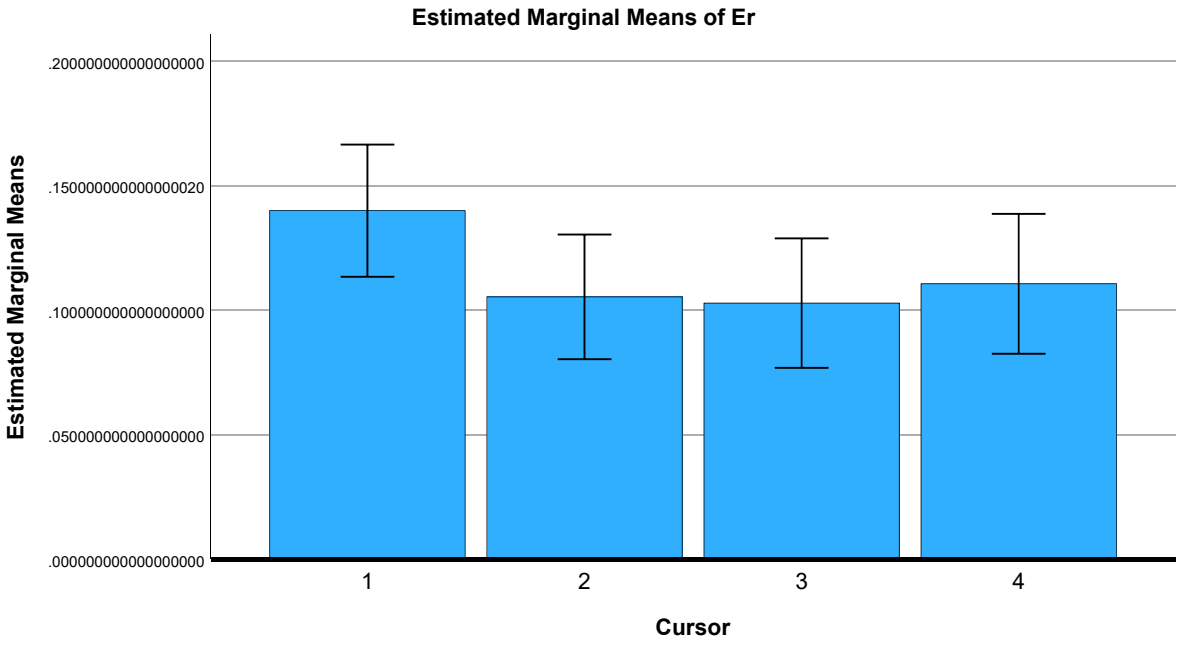
Width	(I) Amp	(J) Amp	Mean Difference (I-J)	Std. Error	Sig.[b]	95% Confidence Interval for Difference[b]	
						Lower Bound	Upper Bound
1	1	2	-.091*	.014	<.001	-.128	-.055
		3	-.119*	.014	<.001	-.153	-.084
	2	1	.091*	.014	<.001	.055	.128
		3	-.027	.011	.058	-.056	.001
	3	1	.119*	.014	<.001	.084	.153
		2	.027	.011	.058	-.001	.056
2	1	2	-.062*	.009	<.001	-.086	-.038
		3	-.085*	.011	<.001	-.115	-.056
	2	1	.062*	.009	<.001	.038	.086
		3	-.023	.012	.183	-.054	.007
	3	1	.085*	.011	<.001	.056	.115
		2	.023	.012	.183	-.007	.054
3	1	2	-.012	.005	.113	-.026	.002
		3	-.028*	.008	.007	-.048	-.007
	2	1	.012	.005	.113	-.002	.026
		3	-.016	.008	.155	-.036	.004
	3	1	.028*	.008	.007	.007	.048
		2	.016	.008	.155	-.004	.036

Based on estimated marginal means

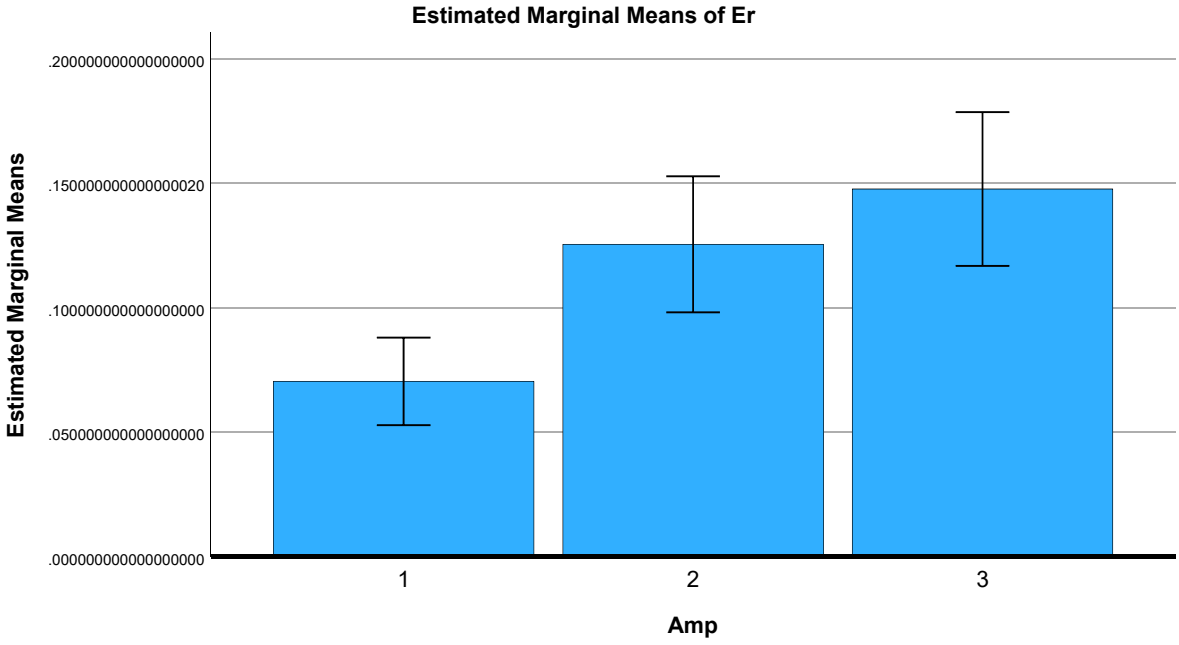
*. The mean difference is significant at the .05 level.

b. Adjustment for multiple comparisons: Bonferroni.

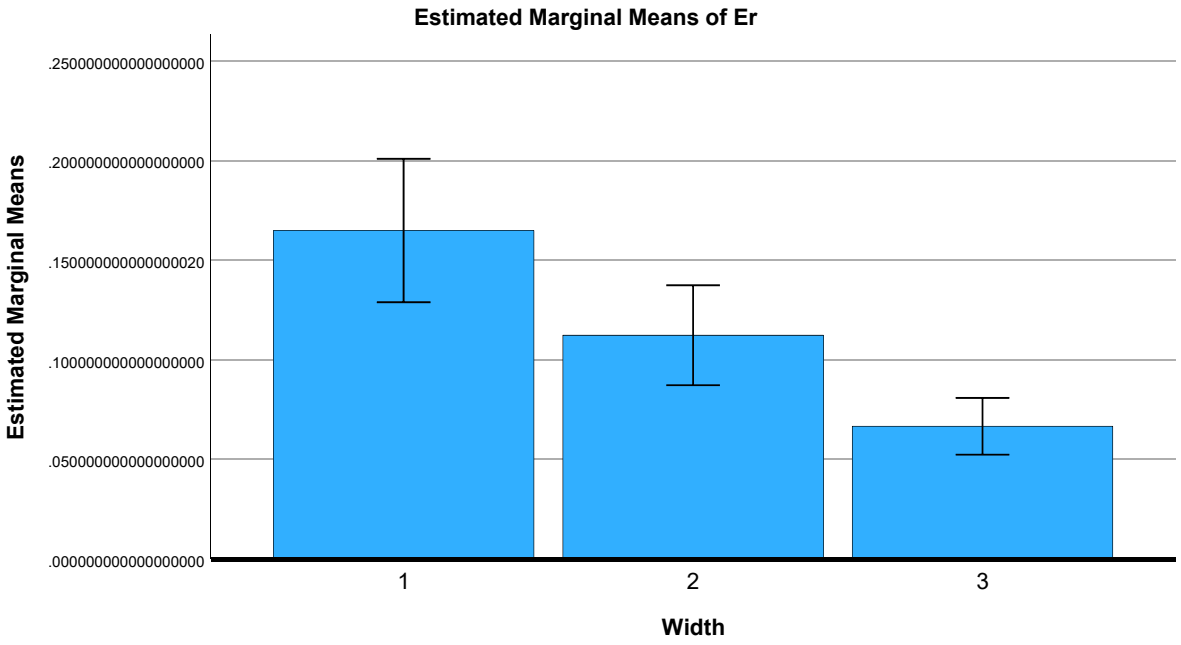
Profile Plots



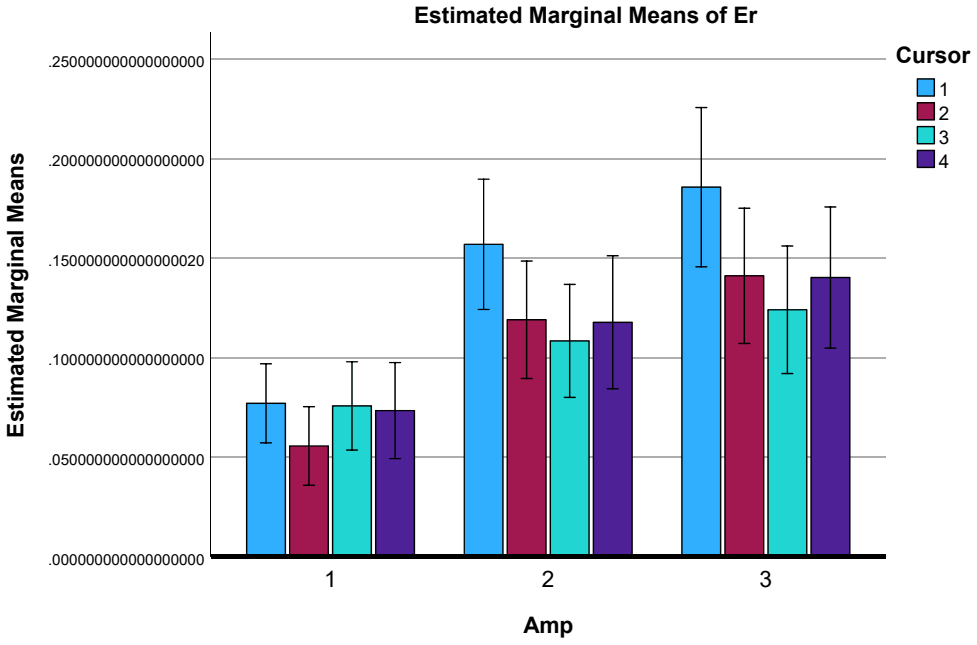
Error bars: 95% CI



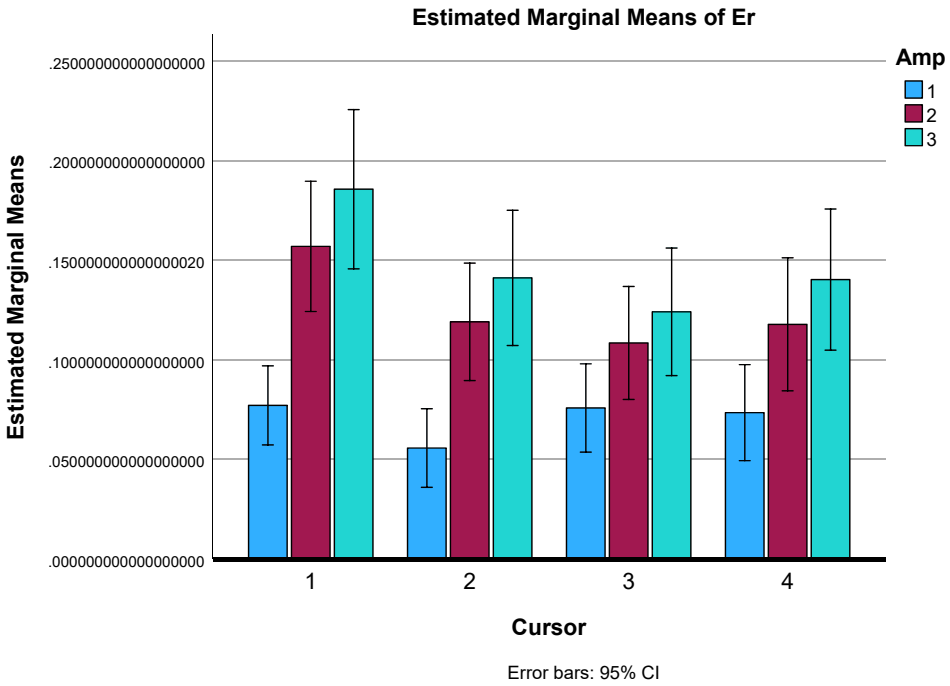
Error bars: 95% CI



Error bars: 95% CI



Error bars: 95% CI


Estimated Marginal Means of Er
Estimated Marginal Means
.250000000000000000
.200000000000000000
.150000000000000020
.100000000000000000
.050000000000000000
.000000000000000000
1
2
3
4
Cursor
Amp
1
2
3
Error bars: 95% CI