

Throughput

Within-Subjects Factors

Measure: Throughput

Cursor	Amp	Width	Dependent Variable
1	1	1	Head__amp_7__width_1
		2	Head__amp_7__width_2
		3	Head__amp_7__width_4
	2	1	Head__amp_25__width_1
		2	Head__amp_25__width_2
		3	Head__amp_25__width_4
	3	1	Head__amp_40__width_1
		2	Head__amp_40__width_2
		3	Head__amp_40__width_4
2	1	1	Low__amp_7__width_1
		2	Low__amp_7__width_2
		3	Low__amp_7__width_4
	2	1	Low__amp_25__width_1
		2	Low__amp_25__width_2
		3	Low__amp_25__width_4
	3	1	Low__amp_40__width_1
		2	Low__amp_40__width_2
		3	Low__amp_40__width_4
3	1	1	Mid__amp_7__width_1
		2	Mid__amp_7__width_2
		3	Mid__amp_7__width_4

Within-Subjects Factors

Measure: Throughput

Cursor	Amp	Width	Dependent Variable
	2	1	Mid__amp_25__width_1
		2	Mid__amp_25__width_2
		3	Mid__amp_25__width_4
	3	1	Mid__amp_40__width_1
		2	Mid__amp_40__width_2
		3	Mid__amp_40__width_4
4	1	1	High__amp_7__width_1
		2	High__amp_7__width_2
		3	High__amp_7__width_4
	2	1	High__amp_25__width_1
		2	High__amp_25__width_2
		3	High__amp_25__width_4
	3	1	High__amp_40__width_1
		2	High__amp_40__width_2
		3	High__amp_40__width_4

Mauchly's Test of Sphericity^a

Measure: Throughput

Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.	Epsilon ^b Greenhouse-Geisser
Cursor	.621	12.242	5	.032	.768
Amp	.795	5.962	2	.051	.830
Width	.506	17.725	2	<.001	.669
Cursor * Amp	.426	21.143	20	.393	.827
Cursor * Width	.270	32.442	20	.040	.689
Amp * Width	.568	14.398	9	.110	.809
Cursor * Amp * Width	.014	97.923	77	.067	.651

Mauchly's Test of Sphericity^a

Measure: Throughput

Within Subjects Effect	Epsilon ^b	
	Huynh-Feldt	Lower-bound
Cursor	.843	.333
Amp	.878	.500
Width	.691	.500
Cursor * Amp	1.000	.167
Cursor * Width	.830	.167
Amp * Width	.932	.250
Cursor * Amp * Width	.941	.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: Throughput

Source		Type III Sum of Squares	df	Mean Square
Cursor	Sphericity Assumed	.776	3	.259
	Greenhouse-Geisser	.776	2.303	.337
	Huynh-Feldt	.776	2.530	.307
	Lower-bound	.776	1.000	.776
Error(Cursor)	Sphericity Assumed	37.465	81	.463
	Greenhouse-Geisser	37.465	62.182	.602
	Huynh-Feldt	37.465	68.312	.548
	Lower-bound	37.465	27.000	1.388
Amp	Sphericity Assumed	109.643	2	54.822
	Greenhouse-Geisser	109.643	1.660	66.056
	Huynh-Feldt	109.643	1.755	62.469
	Lower-bound	109.643	1.000	109.643
Error(Amp)	Sphericity Assumed	10.541	54	.195
	Greenhouse-Geisser	10.541	44.816	.235
	Huynh-Feldt	10.541	47.389	.222
	Lower-bound	10.541	27.000	.390
Width	Sphericity Assumed	4.362	2	2.181
	Greenhouse-Geisser	4.362	1.338	3.259
	Huynh-Feldt	4.362	1.382	3.155
	Lower-bound	4.362	1.000	4.362
Error(Width)	Sphericity Assumed	11.682	54	.216
	Greenhouse-Geisser	11.682	36.138	.323
	Huynh-Feldt	11.682	37.327	.313
	Lower-bound	11.682	27.000	.433
Cursor * Amp	Sphericity Assumed	8.876	6	1.479
	Greenhouse-Geisser	8.876	4.965	1.788
	Huynh-Feldt	8.876	6.000	1.479
	Lower-bound	8.876	1.000	8.876
Error(Cursor*Amp)	Sphericity Assumed	16.402	162	.101
	Greenhouse-Geisser	16.402	134.050	.122
	Huynh-Feldt	16.402	162.000	.101
	Lower-bound	16.402	27.000	.607
Cursor * Width	Sphericity Assumed	3.441	6	.573
	Greenhouse-Geisser	3.441	4.136	.832
	Huynh-Feldt	3.441	4.978	.691
	Lower-bound	3.441	1.000	3.441
Error(Cursor*Width)	Sphericity Assumed	16.255	162	.100
	Greenhouse-Geisser	16.255	111.681	.146
	Huynh-Feldt	16.255	134.409	.121
	Lower-bound	16.255	27.000	.602

Tests of Within-Subjects Effects

Measure: Throughput

Source		F	Sig.	Partial Eta Squared
Cursor	Sphericity Assumed	.559	.644	.020
	Greenhouse-Geisser	.559	.599	.020
	Huynh-Feldt	.559	.615	.020
	Lower-bound	.559	.461	.020
Error(Cursor)	Sphericity Assumed			
	Greenhouse-Geisser			
	Huynh-Feldt			
	Lower-bound			
Amp	Sphericity Assumed	280.846	<.001	.912
	Greenhouse-Geisser	280.846	<.001	.912
	Huynh-Feldt	280.846	<.001	.912
	Lower-bound	280.846	<.001	.912
Error(Amp)	Sphericity Assumed			
	Greenhouse-Geisser			
	Huynh-Feldt			
	Lower-bound			
Width	Sphericity Assumed	10.082	<.001	.272
	Greenhouse-Geisser	10.082	.001	.272
	Huynh-Feldt	10.082	.001	.272
	Lower-bound	10.082	.004	.272
Error(Width)	Sphericity Assumed			
	Greenhouse-Geisser			
	Huynh-Feldt			
	Lower-bound			
Cursor * Amp	Sphericity Assumed	14.612	<.001	.351
	Greenhouse-Geisser	14.612	<.001	.351
	Huynh-Feldt	14.612	<.001	.351
	Lower-bound	14.612	<.001	.351
Error(Cursor*Amp)	Sphericity Assumed			
	Greenhouse-Geisser			
	Huynh-Feldt			
	Lower-bound			
Cursor * Width	Sphericity Assumed	5.715	<.001	.175
	Greenhouse-Geisser	5.715	<.001	.175
	Huynh-Feldt	5.715	<.001	.175
	Lower-bound	5.715	.024	.175
Error(Cursor*Width)	Sphericity Assumed			
	Greenhouse-Geisser			
	Huynh-Feldt			
	Lower-bound			

Tests of Within-Subjects Effects

Measure: Throughput

Source		Type III Sum of Squares	df	Mean Square
Amp * Width	Sphericity Assumed	3.257	4	.814
	Greenhouse-Geisser	3.257	3.235	1.007
	Huynh-Feldt	3.257	3.727	.874
	Lower-bound	3.257	1.000	3.257
Error(Amp*Width)	Sphericity Assumed	11.631	108	.108
	Greenhouse-Geisser	11.631	87.333	.133
	Huynh-Feldt	11.631	100.622	.116
	Lower-bound	11.631	27.000	.431
Cursor * Amp * Width	Sphericity Assumed	1.016	12	.085
	Greenhouse-Geisser	1.016	7.812	.130
	Huynh-Feldt	1.016	11.296	.090
	Lower-bound	1.016	1.000	1.016
Error(Cursor*Amp*Width)	Sphericity Assumed	29.598	324	.091
	Greenhouse-Geisser	29.598	210.927	.140
	Huynh-Feldt	29.598	304.982	.097
	Lower-bound	29.598	27.000	1.096

Tests of Within-Subjects Effects

Measure: Throughput

Source		F	Sig.	Partial Eta Squared
Amp * Width	Sphericity Assumed	7.560	<.001	.219
	Greenhouse-Geisser	7.560	<.001	.219
	Huynh-Feldt	7.560	<.001	.219
	Lower-bound	7.560	.011	.219
Error(Amp*Width)	Sphericity Assumed			
	Greenhouse-Geisser			
	Huynh-Feldt			
	Lower-bound			
Cursor * Amp * Width	Sphericity Assumed	.927	.520	.033
	Greenhouse-Geisser	.927	.494	.033
	Huynh-Feldt	.927	.516	.033
	Lower-bound	.927	.344	.033
Error(Cursor*Amp*Width)	Sphericity Assumed			
	Greenhouse-Geisser			
	Huynh-Feldt			
	Lower-bound			

Estimated Marginal Means

2. Cursor * Amp

Pairwise Comparisons

Measure: Throughput

Amp	(I) Cursor	(J) Cursor	Mean Difference (I-J)	Std. Error	Sig. ^b	95% Confidence Interval for b...
						Lower Bound
1	1	2	.177	.091	.381	-.083
		3	.354 [*]	.096	.006	.081
		4	.347 [*]	.078	<.001	.127
	2	1	-.177	.091	.381	-.437
		3	.178	.068	.088	-.016
		4	.171	.070	.135	-.030
	3	1	-.354 [*]	.096	.006	-.628
		2	-.178	.068	.088	-.372
		4	-.007	.059	1.000	-.175
	4	1	-.347 [*]	.078	<.001	-.568
		2	-.171	.070	.135	-.371
		3	.007	.059	1.000	-.161
2	1	2	-.127	.080	.746	-.356
		3	-.035	.078	1.000	-.258
		4	-.008	.065	1.000	-.193
	2	1	.127	.080	.746	-.101
		3	.092	.070	1.000	-.106
		4	.119	.061	.363	-.054
	3	1	.035	.078	1.000	-.187
		2	-.092	.070	1.000	-.290
		4	.027	.063	1.000	-.153
	4	1	.008	.065	1.000	-.177
		2	-.119	.061	.363	-.293
		3	-.027	.063	1.000	-.208
3	1	2	-.043	.066	1.000	-.232
		3	-.154	.088	.553	-.404
		4	-.166 [*]	.055	.032	-.321
	2	1	.043	.066	1.000	-.146
		3	-.111	.072	.798	-.315
		4	-.123	.061	.334	-.298
	3	1	.154	.088	.553	-.097
		2	.111	.072	.798	-.093
		4	-.012	.070	1.000	-.213
	4	1	.166 [*]	.055	.032	.010
		2	.123	.061	.334	-.052
		3	.012	.070	1.000	-.188

Pairwise Comparisons

Measure: Throughput

			95% Confidence Interval for ^b ...
Amp	(I) Cursor	(J) Cursor	Upper Bound
1	1	2	.437
		3	.628
		4	.568
	2	1	.083
		3	.372
		4	.371
	3	1	-.081
		2	.016
		4	.161
	4	1	-.127
		2	.030
		3	.175
2	1	2	.101
		3	.187
		4	.177
	2	1	.356
		3	.290
		4	.293
	3	1	.258
		2	.106
		4	.208
	4	1	.193
		2	.054
		3	.153
3	1	2	.146
		3	.097
		4	-.010
	2	1	.232
		3	.093
		4	.052
	3	1	.404
		2	.315
		4	.188
	4	1	.321
		2	.298
		3	.213

Based on estimated marginal means

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

b. Adjustment for multiple comparisons: Bonferroni.

4. Cursor * Width

Pairwise Comparisons

Measure: Throughput

Width	(I) Cursor	(J) Cursor	Mean Difference (I-J)	Std. Error	Sig. ^b	95% Confidence Interval for ^b ... Lower Bound
1	1	2	-.117	.064	.469	-.298
		3	-.094	.070	1.000	-.295
		4	-.140	.063	.205	-.318
	2	1	.117	.064	.469	-.065
		3	.022	.066	1.000	-.166
		4	-.023	.060	1.000	-.195
	3	1	.094	.070	1.000	-.106
		2	-.022	.066	1.000	-.210
		4	-.045	.062	1.000	-.221
	4	1	.140	.063	.205	-.039
		2	.023	.060	1.000	-.149
		3	.045	.062	1.000	-.130
2	1	2	-.024	.071	1.000	-.226
		3	.062	.092	1.000	-.200
		4	.081	.055	.922	-.076
	2	1	.024	.071	1.000	-.179
		3	.086	.065	1.000	-.098
		4	.105	.067	.773	-.085
	3	1	-.062	.092	1.000	-.324
		2	-.086	.065	1.000	-.270
		4	.019	.078	1.000	-.203
	4	1	-.081	.055	.922	-.238
		2	-.105	.067	.773	-.295
		3	-.019	.078	1.000	-.241
3	1	2	.147	.098	.875	-.133
		3	.198	.099	.341	-.085
		4	.233 [*]	.074	.025	.021
	2	1	-.147	.098	.875	-.427
		3	.051	.076	1.000	-.165
		4	.085	.069	1.000	-.110
	3	1	-.198	.099	.341	-.481
		2	-.051	.076	1.000	-.266
		4	.035	.056	1.000	-.125
	4	1	-.233 [*]	.074	.025	-.444
		2	-.085	.069	1.000	-.281
		3	-.035	.056	1.000	-.195

Pairwise Comparisons

Measure: Throughput

Width	(I) Cursor	(J) Cursor	95% Confidence Interval for ... Upper Bound
1	1	2	.065
		3	.106
		4	.039
	2	1	.298
		3	.210
		4	.149
	3	1	.295
		2	.166
		4	.130
	4	1	.318
		2	.195
		3	.221
2	1	2	.179
		3	.324
		4	.238
	2	1	.226
		3	.270
		4	.295
	3	1	.200
		2	.098
		4	.241
	4	1	.076
		2	.085
		3	.203
3	1	2	.427
		3	.481
		4	.444
	2	1	.133
		3	.266
		4	.281
	3	1	.085
		2	.165
		4	.195
	4	1	-.021
		2	.110
		3	.125

Based on estimated marginal means

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

b. Adjustment for multiple comparisons: Bonferroni.

6. Cursor * Amp * Width

Pairwise Comparisons

Measure: Throughput

Amp	Width	(I) Cursor	(J) Cursor	Mean Difference (I-J)	Std. Error	Sig. ^b	95% Confidence Interval for D... Lower Bound
1	1	1	2	-.008	.088	1.000	-.259
			3	.180	.087	.292	-.068
			4	.077	.089	1.000	-.177
		2	1	.008	.088	1.000	-.242
			3	.188	.088	.254	-.063
			4	.085	.092	1.000	-.178
		3	1	-.180	.087	.292	-.429
			2	-.188	.088	.254	-.440
			4	-.103	.071	.953	-.307
		4	1	-.077	.089	1.000	-.330
			2	-.085	.092	1.000	-.348
			3	.103	.071	.953	-.100
2	2	1	2	.082	.117	1.000	-.250
			3	.298	.134	.206	-.083
			4	.397*	.111	.008	.082
		2	1	-.082	.117	1.000	-.414
			3	.216	.105	.301	-.084
			4	.315	.112	.054	-.004
		3	1	-.298	.134	.206	-.679
			2	-.216	.105	.301	-.516
			4	.098	.097	1.000	-.178
		4	1	-.397*	.111	.008	-.711
			2	-.315	.112	.054	-.633
			3	-.098	.097	1.000	-.375
3	3	1	2	.456*	.151	.033	.026
			3	.585*	.144	.002	.173
			4	.569*	.122	<.001	.220
		2	1	-.456*	.151	.033	-.886
			3	.128	.089	.980	-.126
			4	.113	.075	.853	-.099
		3	1	-.585*	.144	.002	-.996
			2	-.128	.089	.980	-.383
			4	-.016	.089	1.000	-.269
		4	1	-.569*	.122	<.001	-.918
			2	-.113	.075	.853	-.325
			3	.016	.089	1.000	-.238

Pairwise Comparisons

Measure: Throughput

				95% Confidence Interval for μ_b
Amp	Width	(I) Cursor	(J) Cursor	Upper Bound
1	1	1	2	.242
			3	.429
			4	.330
		2	1	.259
			3	.440
			4	.348
		3	1	.068
			2	.063
			4	.100
		4	1	.177
			2	.178
			3	.307
	2	1	2	.414
			3	.679
			4	.711
		2	1	.250
			3	.516
			4	.633
		3	1	.083
			2	.084
			4	.375
		4	1	-.082
			2	.004
			3	.178
	3	1	2	.886
			3	.996
			4	.918
		2	1	-.026
			3	.383
			4	.325
		3	1	-.173
			2	.126
			4	.238
		4	1	-.220
			2	.099
			3	.269

Pairwise Comparisons

Measure: Throughput

Amp	Width	(I) Cursor	(J) Cursor	Mean Difference	Std. Error	Sig. ^b	95% Confidence Interval for ...
				(I-J)			Lower Bound
2	1	1	2	-.179	.098	.463	-.457
			3	-.159	.087	.477	-.406
			4	-.121	.097	1.000	-.396
		2	1	.179	.098	.463	-.098
			3	.021	.097	1.000	-.256
			4	.058	.097	1.000	-.218
		3	1	.159	.087	.477	-.089
			2	-.021	.097	1.000	-.298
			4	.037	.082	1.000	-.197
		4	1	.121	.097	1.000	-.153
			2	-.058	.097	1.000	-.334
			3	-.037	.082	1.000	-.271
	2	1	2	-.106	.086	1.000	-.350
			3	.015	.111	1.000	-.300
			4	-.014	.066	1.000	-.203
		2	1	.106	.086	1.000	-.139
			3	.121	.104	1.000	-.176
			4	.091	.076	1.000	-.126
		3	1	-.015	.111	1.000	-.330
			2	-.121	.104	1.000	-.417
			4	-.029	.094	1.000	-.298
		4	1	.014	.066	1.000	-.174
			2	-.091	.076	1.000	-.309
			3	.029	.094	1.000	-.239
3	3	1	2	-.097	.113	1.000	-.419
			3	.038	.102	1.000	-.254
			4	.112	.087	1.000	-.137
		2	1	.097	.113	1.000	-.225
			3	.135	.105	1.000	-.163
			4	.209	.100	.281	-.077
		3	1	-.038	.102	1.000	-.329
			2	-.135	.105	1.000	-.433
			4	.074	.105	1.000	-.226
		4	1	-.112	.087	1.000	-.361
			2	-.209	.100	.281	-.495
			3	-.074	.105	1.000	-.374
3	1	1	2	-.163	.072	.192	-.368
			3	-.305*	.100	.032	-.591
			4	-.375*	.094	.003	-.642

Pairwise Comparisons

Measure: Throughput

				95% Confidence Interval for μ_b
Amp	Width	(I) Cursor	(J) Cursor	Upper Bound
2	1	1	2	.098
			3	.089
			4	.153
		2	1	.457
			3	.298
			4	.334
		3	1	.406
			2	.256
			4	.271
		4	1	.396
			2	.218
			3	.197
	2	1	2	.139
			3	.330
			4	.174
		2	1	.350
			3	.417
			4	.309
		3	1	.300
			2	.176
			4	.239
		4	1	.203
			2	.126
			3	.298
	3	1	2	.225
			3	.329
			4	.361
		2	1	.419
			3	.433
			4	.495
		3	1	.254
			2	.163
			4	.374
		4	1	.137
			2	.077
			3	.226
3	1	1	2	.042
			3	-.019
			4	-.107

Pairwise Comparisons

Measure: Throughput

Amp	Width	(I) Cursor	(J) Cursor	Mean Difference (I-J)	Std. Error	Sig. ^b	95% Confidence Interval for ... Lower Bound
	2	2	1	.163	.072	.192	-.042
			3	-.142	.081	.548	-.372
			4	-.212	.084	.107	-.450
		3	1	.305*	.100	.032	.019
			2	.142	.081	.548	-.089
			4	-.070	.099	1.000	-.353
		4	1	.375*	.094	.003	.107
			2	.212	.084	.107	-.027
			3	.070	.099	1.000	-.213
		1	2	-.047	.107	1.000	-.353
			3	-.127	.108	1.000	-.433
			4	-.140	.077	.481	-.358
	3	2	1	.047	.107	1.000	-.258
			3	-.079	.087	1.000	-.326
			4	-.092	.100	1.000	-.376
		3	1	.127	.108	1.000	-.179
			2	.079	.087	1.000	-.167
			4	-.013	.109	1.000	-.324
		4	1	.140	.077	.481	-.079
			2	.092	.100	1.000	-.192
			3	.013	.109	1.000	-.298
	4	1	2	.082	.090	1.000	-.174
			3	-.029	.121	1.000	-.373
			4	.017	.094	1.000	-.250
		2	1	-.082	.090	1.000	-.339
			3	-.111	.109	1.000	-.421
			4	-.065	.088	1.000	-.315
		3	1	.029	.121	1.000	-.315
			2	.111	.109	1.000	-.198
			4	.046	.065	1.000	-.140
		4	1	-.017	.094	1.000	-.284
			2	.065	.088	1.000	-.185
			3	-.046	.065	1.000	-.232

Pairwise Comparisons

Measure: Throughput

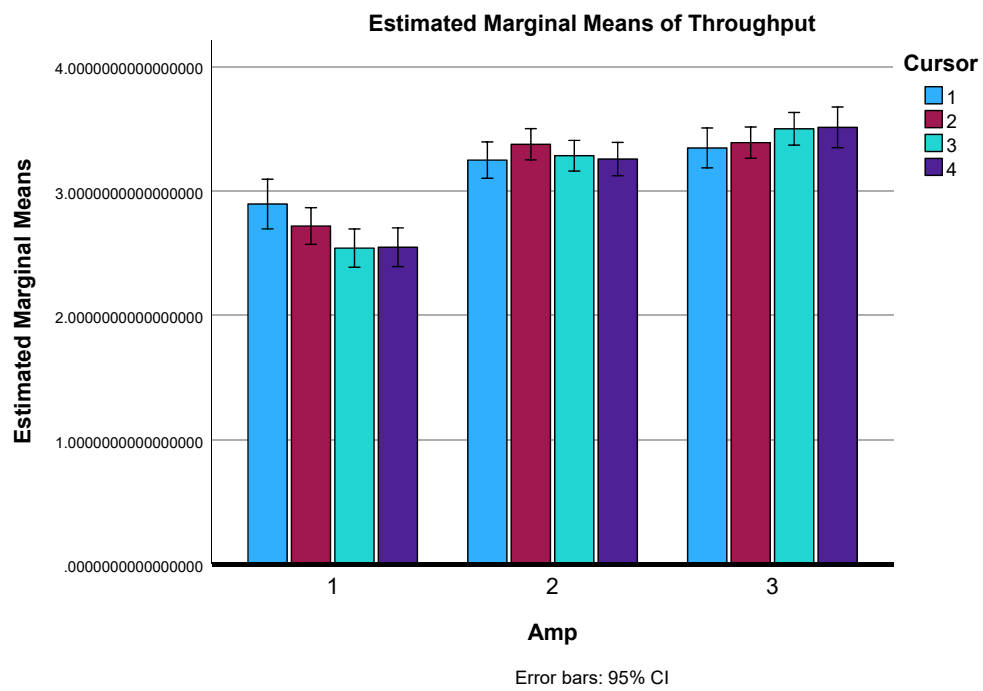
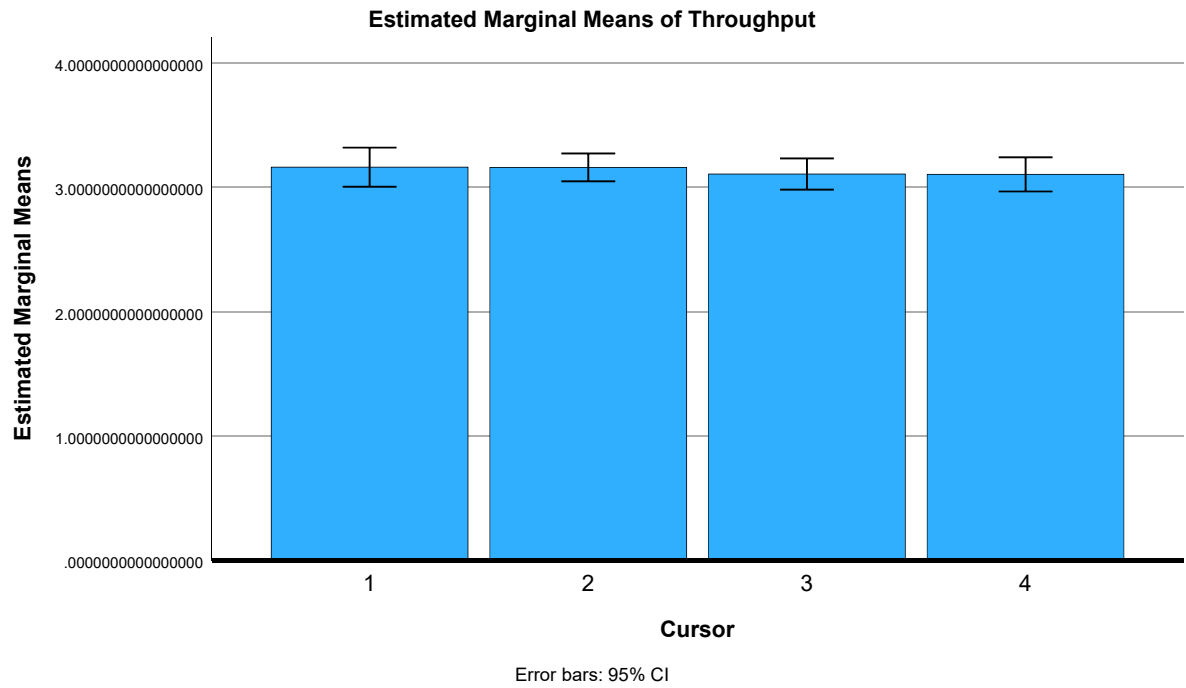
				95% Confidence Interval for ^b ...
Amp	Width	(I) Cursor	(J) Cursor	Upper Bound
	2	2	1	.368
			3	.089
			4	.027
		3	1	.591
			2	.372
			4	.213
		4	1	.642
			2	.450
			3	.353
	2	1	2	.258
			3	.179
			4	.079
		2	1	.353
			3	.167
			4	.192
		3	1	.433
			2	.326
			4	.298
		4	1	.358
			2	.376
			3	.324
	3	1	2	.339
			3	.315
			4	.284
		2	1	.174
			3	.198
			4	.185
		3	1	.373
			2	.421
			4	.232
		4	1	.250
			2	.315
			3	.140

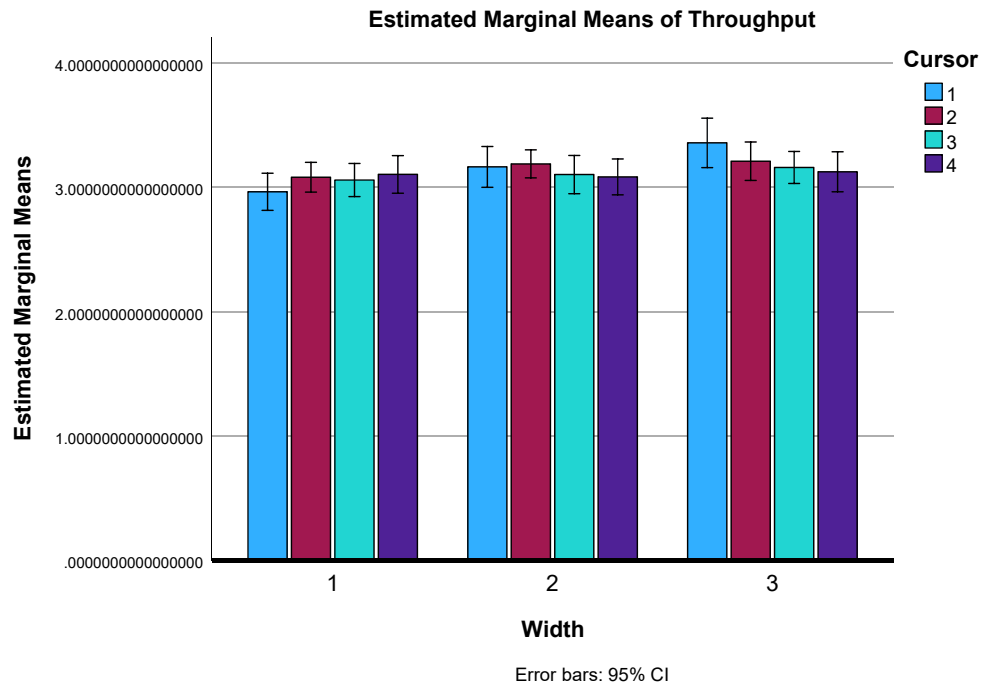
Based on estimated marginal means

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

b. Adjustment for multiple comparisons: Bonferroni.

Profile Plots





Width * Cursor * Amp

