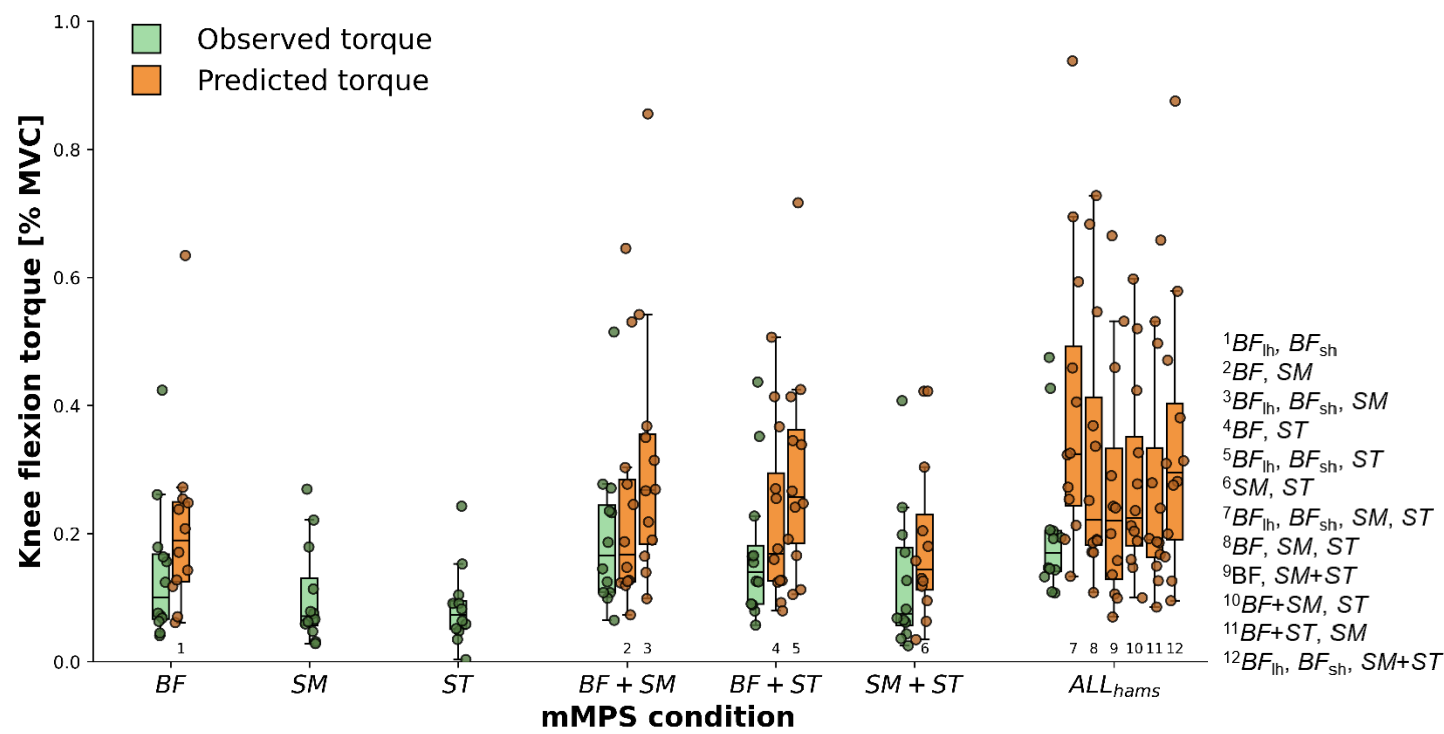
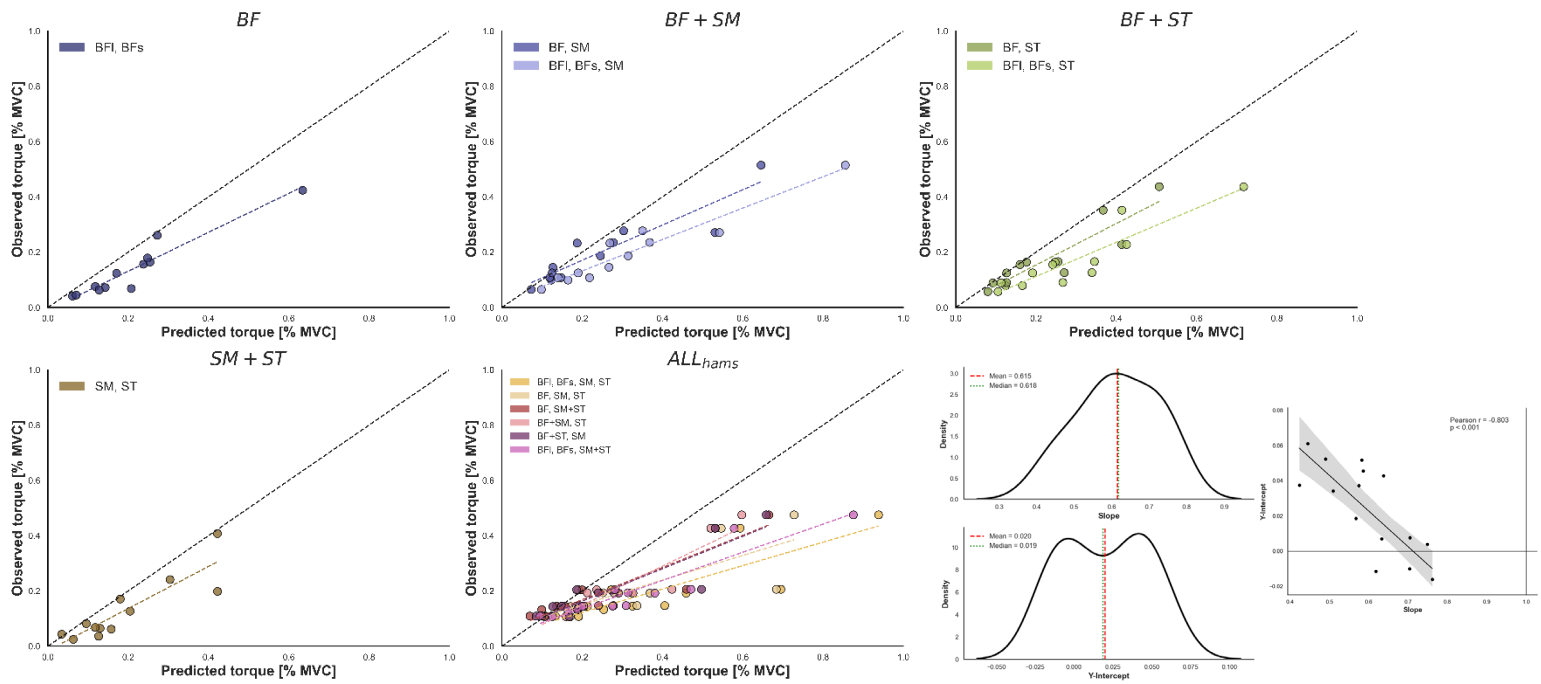


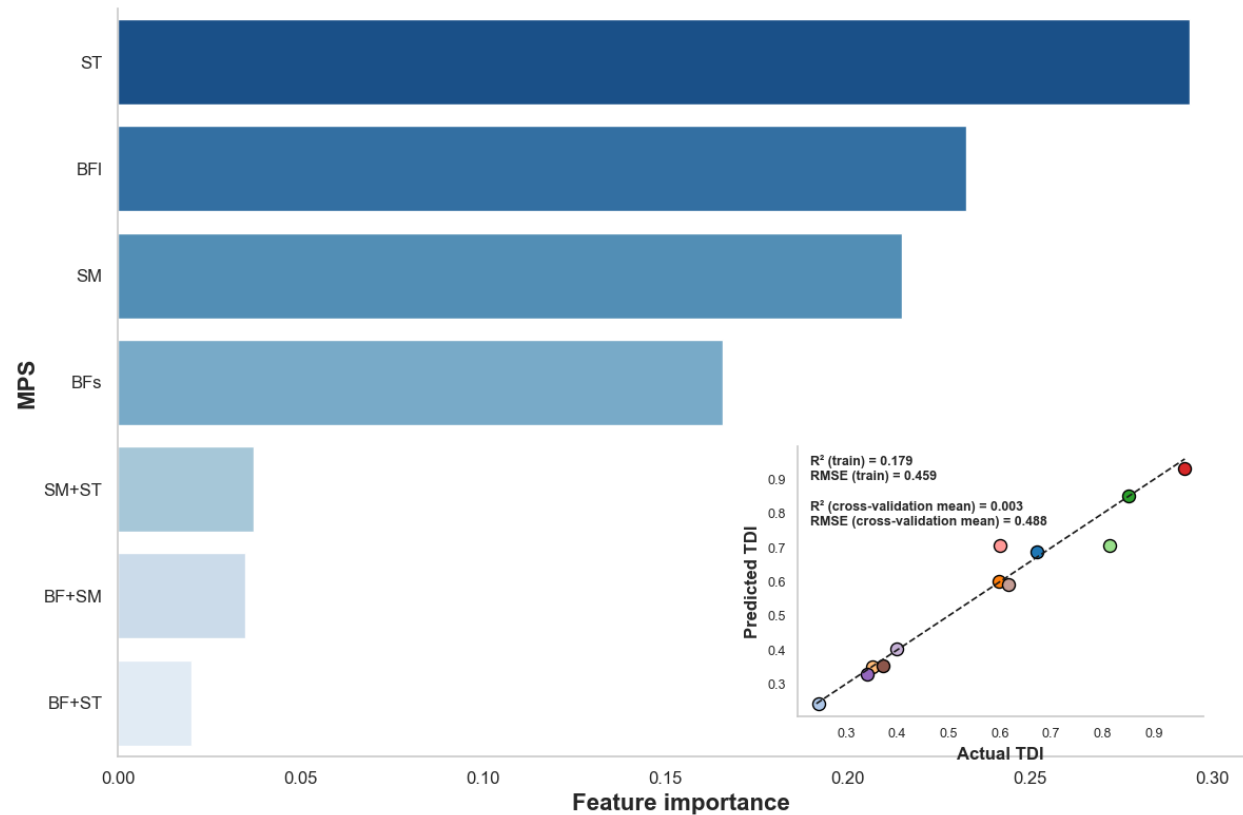
SUPPLEMENTARY MATERIALS



Supplementary Figure S1. Boxplots of observed and predicted torque combinations across all hamstring mMPS conditions.



Supplementary Figure S2. Linear regression between predicted and observed hamstrings torques for all τ_{pre} combinations and corresponding slope and y-intercept metrics.



Supplementary Figure S3. Random Forest regression feature importance and model performance for predicting the torque deviation index (TDI) for the hamstrings. Model performance was limited, likely reflecting the smaller number of hamstring conditions and reduced variance structure compared with the quadriceps.

Supplementary Table S1. Summary of Pairwise Comparisons and Effect Sizes Between Motor Point Stimulation Conditions and Single-electrode Stimulation

Muscle Group	MPS Condition	Mean Difference (%MVC)	95% CI	<i>t</i>	<i>P</i>	Cohen's <i>d_z/d_{av}</i>
Anterior Thigh	<i>ALL</i> _{quads}	11.20	[5.08, 17.32]	4.028	0.010	1.16/1.06
	<i>VM+VL</i>	5.77	[0.84, 10.70]	2.576	0.103	0.74/0.59
	<i>RF+VL</i>	3.22	[-0.95, 7.39]	1.701	0.491	0.49/0.37
	<i>VM+RF</i>	-0.63	[-5.96, 4.71]	-0.258	0.801	-0.07/-0.07
	<i>VL</i>	-2.46	[-5.71, 0.78]	-1.672	0.351	-0.48/-0.33
	<i>RF</i>	-7.89	[-11.55, -4.23]	-4.742	0.004	-1.37/-1.15
	<i>VM</i>	-12.02	[-15.52, -8.52]	-7.563	<0.001	-2.18/-2.20
	<i>VL_p</i>	-12.21	[-16.98, -7.45]	-5.643	0.001	-1.63/-2.13
	<i>VL_i</i>	-12.59	[-15.47, -9.71]	-9.627	<0.001	-2.78/-2.17
	<i>VL_d</i>	-18.16	[-22.31, -14.02]	-9.650	<0.001	-2.79/-3.66
	<i>RF_p</i>	-13.36	[-16.36, -10.37]	-9.809	<0.001	-2.83/-2.27
	<i>RF_d</i>	-13.12	[-16.78, -9.46]	-7.887	<0.001	-2.28/-2.02
	<i>VM_p</i>	-15.37	[-19.93, -10.83]	-7.427	<0.001	-2.14/-2.69
	<i>VM_d</i>	-16.89	[-20.58, -13.20]	-10.074	<0.001	-2.91/-3.35
Posterior Thigh	<i>ALL</i> _{hams}	-1.76	[-6.98, 3.47]	-0.741	0.474	-0.21/-0.17
	<i>BF+SM</i>	-2.72	[-7.12, 1.68]	-1.359	0.403	-0.39/-0.26
	<i>BF+ST</i>	-5.22	[-9.87, -0.57]	-2.470	0.093	-0.71/-0.51
	<i>SM+ST</i>	-9.74	[-16.80, -2.67]	-3.031	0.046	-0.88/-0.97
	<i>BF</i>	-8.51	[-13.04, -3.98]	-4.137	0.008	-1.19/-0.85
	<i>SM</i>	-12.18	[-17.42, -6.94]	-5.118	0.002	-1.48/-1.48
	<i>ST</i>	-13.91	[-20.11, -7.71]	-4.938	0.003	-1.43/-1.85
	<i>BF_{lh}</i>	-10.61	[-13.60, -7.61]	-7.801	<0.001	-2.25/-1.28
	<i>BF_{sh}</i>	-13.09	[-17.18, -9.00]	-7.041	<0.001	-2.03/-1.58

Abbreviations: CI, confidence interval; MPS, motor point stimulation; MVC, maximal voluntary contraction.

P values are Holm step-down corrected.

Supplementary Table S2. Summary of Within-mMPS Pairwise Comparisons and Effect Sizes

Muscle Group	mMPS Comparison	Mean	95% CI	<i>t</i>	<i>P</i>	Cohen's <i>d_z/d_{av}</i>
		Difference (%MVC)				
Anterior Thigh	<i>ALL</i> _{quads} vs <i>VM+VL</i>	5.44	[1.63, 9.24]	3.150	0.195	0.91/0.43
	<i>ALL</i> _{quads} vs <i>RF+VL</i>	7.98	[5.16, 10.81]	6.220	0.001	1.80/0.67
	<i>ALL</i> _{quads} vs <i>VM+RF</i>	11.83	[5.92, 17.73]	4.410	0.022	1.27/1.01
	<i>ALL</i> _{quads} vs <i>VM</i>	23.23	[16.60, 29.85]	7.720	<0.001	2.23/2.37
	<i>ALL</i> _{quads} vs <i>RF</i>	19.09	[12.01, 26.17]	5.940	0.002	1.71/1.79
	<i>ALL</i> _{quads} vs <i>VL</i>	13.67	[9.37, 17.96]	7.000	<0.001	2.02/1.23
	<i>VM+VL</i> vs <i>RF+VL</i>	2.55	[-0.67, 5.76]	1.740	1.000	0.50/0.23
	<i>VM+VL</i> vs <i>VM+RF</i>	6.39	[0.89, 11.90]	2.550	0.562	0.74/0.59
	<i>RF+VL</i> vs <i>VM+RF</i>	3.85	[-1.22, 8.92]	1.670	1.000	0.48/0.38
	<i>VM+VL</i> vs <i>VM</i>	17.79	[11.72, 23.86]	6.450	<0.001	1.86/2.01
	<i>VM+VL</i> vs <i>RF</i>	13.66	[7.86, 19.46]	5.180	0.006	1.50/1.40
	<i>VM+VL</i> vs <i>VL</i>	8.23	[5.10, 11.36]	5.790	0.003	1.67/0.80
	<i>RF+VL</i> vs <i>VM</i>	15.24	[10.30, 20.19]	6.780	<0.001	1.96/1.97
	<i>RF+VL</i> vs <i>RF</i>	11.11	[5.94, 16.28]	4.730	0.013	1.36/1.26
	<i>RF+VL</i> vs <i>VL</i>	5.68	[2.96, 8.40]	4.600	0.016	1.33/0.61
	<i>VM+RF</i> vs <i>VM</i>	11.40	[6.24, 16.55]	4.860	0.010	1.40/1.53
	<i>VM+RF</i> vs <i>RF</i>	7.26	[3.71, 10.82]	4.500	0.019	1.30/0.85
	<i>VM+RF</i> vs <i>VL</i>	1.84	[-1.92, 5.59]	1.080	1.000	0.31/0.20
	<i>VM</i> vs <i>RF</i>	-4.14	[-8.49, 0.22]	2.090	1.000	-0.60/-0.74
	<i>VM</i> vs <i>VL</i>	-9.56	[-13.60, -5.52]	5.200	0.006	-1.50/-1.49
	<i>RF</i> vs <i>VL</i>	-5.42	[-8.73, -2.12]	3.610	0.086	-1.04/-0.71
Posterior Thigh	<i>ALL</i> _{hams} vs <i>BF+SM</i>	0.96	[-3.00, 4.92]	0.533	1.000	0.15/0.08
	<i>ALL</i> _{hams} vs <i>BF+ST</i>	3.46	[1.76, 5.16]	4.479	0.020	1.29/0.30
	<i>ALL</i> _{hams} vs <i>SM+ST</i>	7.98	[3.92, 12.03]	4.331	0.025	1.25/0.69
	<i>ALL</i> _{hams} vs <i>BF</i>	6.75	[1.15, 12.36]	2.652	0.473	0.77/0.58
	<i>ALL</i> _{hams} vs <i>SM</i>	10.42	[4.84, 16.01]	4.106	0.037	1.19/1.03
	<i>ALL</i> _{hams} vs <i>ST</i>	12.15	[5.93, 18.37]	4.300	0.026	1.24/1.27
	<i>BF+SM</i> vs <i>BF+ST</i>	2.503	[-0.68, 5.69]	1.731	1.000	0.50/0.21
	<i>BF+SM</i> vs <i>SM+ST</i>	7.018	[0.30, 13.74]	2.299	0.884	0.66/0.60
	<i>BF+ST</i> vs <i>SM+ST</i>	4.515	[0.41, 8.62]	2.419	0.715	0.70/0.40
	<i>BF+SM</i> vs <i>BF</i>	5.794	[3.14, 8.44]	4.812	0.011	1.39/0.49
	<i>BF+SM</i> vs <i>SM</i>	9.465	[4.20, 14.73]	3.955	0.047	1.14/0.92
	<i>BF+SM</i> vs <i>ST</i>	11.193	[3.71, 18.67]	3.294	0.15	0.95/1.15
	<i>BF+ST</i> vs <i>BF</i>	3.291	[-1.34, 7.92]	1.565	1.000	0.45/0.29
	<i>BF+ST</i> vs <i>SM</i>	6.962	[2.42, 11.50]	3.377	0.130	0.97/0.71
	<i>BF+ST</i> vs <i>ST</i>	8.690	[2.84, 14.54]	3.267	0.158	0.94/0.94
	<i>SM+ST</i> vs <i>BF</i>	-1.224	[-8.78, 6.33]	-0.357	1.000	0.10/0.11
	<i>SM+ST</i> vs <i>SM</i>	2.447	[-2.32, 7.22]	1.129	1.000	0.33/0.25
	<i>SM+ST</i> vs <i>ST</i>	4.175	[0.16, 8.19]	2.289	0.884	0.66/0.46
	<i>BF</i> vs <i>SM</i>	3.671	[-1.09, 8.43]	1.699	1.000	0.49/0.38
	<i>BF</i> vs <i>ST</i>	5.399	[-1.93, 12.72]	1.622	1.000	0.47/0.60
	<i>SM</i> vs <i>ST</i>	1.728	[-1.95, 5.41]	1.034	1.000	0.30/0.24

Abbreviations: CI, confidence interval; mMPS, multiple motor point stimulation; MVC, maximal voluntary contraction.

P values are Bonferroni post-hoc adjusted.

Supplementary Table S3. Summary of Observed and Predicted Torque Pairwise Comparisons ($\tau_{\text{obs}} - \tau_{\text{pre}}$) and Effect Sizes for the Quadriceps

mMPS Comparison	Mean Difference (%MVC)	95% CI	<i>t</i>	<i>P</i>	Cohen's <i>d_z</i> / <i>d_{av}</i>
<i>VM</i> ¹	-1.81	[-4.47, 0.85]	-1.499	0.162	-0.43/-0.35
<i>RF</i> ²	-3.45	[-7.06, 0.15]	-2.107	0.059	-0.61/-0.38
<i>VL</i> ³	-3.59	[-7.03, -0.15]	-2.300	0.042	-0.66/-0.44
<i>VM+RF</i> ⁴	-8.03	[-14.43, 1.62]	-2.758	0.075	-0.80/-0.64
<i>VM+RF</i> ⁵	-6.22	[-11.52, -0.92]	-2.583	0.075	-0.75/-0.54
<i>VM+RF</i> ⁶	-4.57	[-8.36, -0.78]	-2.656	0.075	-0.77/-0.43
<i>VM+RF</i> ⁷	-2.76	[-5.41, -0.11]	-2.295	0.075	-0.66/-0.30
<i>VM+VL</i> ⁸	-7.20	[-13.39, -1.00]	-2.557	0.096	-0.74/-0.59
<i>VM+VL</i> ⁹	-5.49	[-9.92, -0.85]	-2.615	0.096	-0.75/-0.49
<i>VM+VL</i> ¹⁰	-3.61	[-8.27, 1.06]	-1.700	0.234	-0.49/-0.29
<i>VM+VL</i> ¹¹	-1.80	[-4.26, 0.67]	-1.602	0.234	-0.46/-0.16
<i>RF+VL</i> ¹²	-15.52	[-23.28, -7.78]	-4.409	0.004	-1.27/-1.16
<i>RF+VL</i> ¹³	-12.07	[-19.02, -5.12]	-3.822	0.008	-1.10/-1.00
<i>RF+VL</i> ¹⁴	-11.93	[-19.22, -4.64]	-3.600	0.008	-1.04/-0.85
<i>RF+VL</i> ¹⁵	-8.48	[-13.76, -3.20]	-3.535	0.008	-1.02/-0.69
<i>ALL</i> _{quads} ¹⁶	-19.38	[-28.58, -10.18]	-4.636	0.020	-1.34/-1.12
<i>ALL</i> _{quads} ¹⁷	-17.57	[-25.46, -9.68]	-4.900	0.014	-1.41/-1.10
<i>ALL</i> _{quads} ¹⁸	-15.92	[-23.66, -8.19]	-4.534	0.022	-1.31/-1.02
<i>ALL</i> _{quads} ¹⁹	-15.79	[-24.85, -6.73]	-3.836	0.058	-1.11/-0.89
<i>ALL</i> _{quads} ²⁰	-10.52	[-15.91, -5.14]	-4.299	0.030	-1.24/-0.70
<i>ALL</i> _{quads} ²¹	-14.12	[-20.68, -7.55]	-4.734	0.017	-1.37/-0.98
<i>ALL</i> _{quads} ²²	-12.33	[-18.94, -5.73]	-4.110	0.040	-1.19/-0.77
<i>ALL</i> _{quads} ²³	-13.98	[-21.84, -6.11]	-3.912	0.053	-1.13/-0.83
<i>ALL</i> _{quads} ²⁴	-11.35	[-18.58, -4.13]	-3.458	0.091	-1.00/-0.77
<i>ALL</i> _{quads} ²⁵	-12.18	[-20.32, -4.04]	-3.293	0.115	-0.95/-0.72
<i>ALL</i> _{quads} ²⁶	-3.85	[-6.76, -0.20]	-2.919	0.191	-0.84/-0.27
<i>ALL</i> _{quads} ²⁷	-2.04	[-4.09, 0.00]	-2.206	0.295	-0.64/-0.15
<i>ALL</i> _{quads} ²⁸	-8.73	[-14.77, -2.68]	-3.178	0.132	-0.92/-0.57
<i>ALL</i> _{quads} ²⁹	-7.76	[-13.58, -1.94]	-2.933	0.191	-0.85/-0.51

Abbreviations: CI, confidence interval; mMPS, multiple motor point stimulation; MVC, maximal voluntary contraction.

P values, other than for *VM*, *RF*, and *VL*, are Holm step-down corrected.

Superscript numbers for mMPS comparisons indicate the identity of the mMPS combination used for the comparison.

Supplementary Table S4. Summary of Linear Regression Slopes and Intercepts for Hamstrings mMPS τ_{obs} and τ_{pre} Comparisons

Reference Number	mMPS Condition	τ_{pre} Combination	Slope	Y-intercept	Alignment Score
7	<i>ALL</i> _{hams}	<i>BF</i> _{lh} , <i>BF</i> _{sh} , <i>SM</i> , <i>ST</i>	0.424	0.037	0.425
8	<i>ALL</i> _{hams}	<i>BF</i> , <i>SM</i> , <i>ST</i>	0.445	0.061	0.449
12	<i>ALL</i> _{hams}	<i>BF</i> _{lh} , <i>BF</i> _{sh} , <i>SM</i> + <i>ST</i>	0.510	0.034	0.511
3	<i>BF</i> + <i>SM</i>	<i>BF</i> _{lh} , <i>BF</i> _{sh} , <i>SM</i>	0.568	0.019	0.568
9	<i>ALL</i> _{hams}	<i>BF</i> , <i>SM</i> + <i>ST</i>	0.582	0.052	0.585
11	<i>ALL</i> _{hams}	<i>BF</i> + <i>ST</i> , <i>SM</i>	0.586	0.046	0.588
5	<i>BF</i> + <i>ST</i>	<i>BF</i> _{lh} , <i>BF</i> _{sh} , <i>ST</i>	0.618	-0.012	0.618
2	<i>BF</i> + <i>SM</i>	<i>BF</i> , <i>SM</i>	0.638	0.043	0.639
1	<i>BF</i>	<i>BF</i> _{lh} , <i>BF</i> _{sh}	0.704	0.010	0.704
10	<i>ALL</i> _{hams}	<i>BF</i> + <i>SM</i> , <i>ST</i>	0.705	0.008	0.705
4	<i>BF</i> + <i>ST</i>	<i>BF</i> , <i>ST</i>	0.749	0.004	0.749
6	<i>SM</i> + <i>ST</i>	<i>SM</i> , <i>ST</i>	0.762	-0.016	0.762