Online Supporting Information for:

EMMLi: A maximum likelihood approach to the analysis of modularity

A. Goswami and J.A. Finarelli

Table S1: Identification of landmarks from the data set presented in (Goswami and Polly 2010). Numbers indicate the module designations in the present analysis for different model structures. N/F is the Neurocranial/Facial 2-module hypothesis (e.g., Drake and Klingenberg 2010), C6 is the Cheverud 6-module hypothesis from (Cheverud 1995). G6 is the Goswami 6-module hypothesis from (Goswami 2006a). C/G8 is an eight-module model merging the Cheverud and Goswami models. TO is the tissue origin model is as described in (Goswami 2006a). CMM and GMM are "monotreme" model hypotheses that are modifications of each six-module hypotheses (Cheverud and Goswami, respectively) with some strong modules (either 1,2, and 6 or just 1 and 6) and some unintegrated traits (Unint.), similar to the monotreme pattern described in (Goswami 2006a).

	Landmark	N/F	C6	G6	C/G 8	TO	CMM	GMM
1	Premaxilla anterior midline suture	1	1	1	1	Neural Crest	1	1
2	Premaxilla - Maxilla lateral suture - left	1	1	1	1	Neural Crest	1	1
3	Premaxilla - Maxilla lateral suture - right	1	1	1	1	Neural Crest	1	1
4	Premaxilla - Maxilla ventral suture	1	1	1	8	Neural Crest	1	1
5	Canine - lateral extreme - left	1	1	1	8	Neural Crest	1	1
6	Canine - mesial extreme - left	1	1	1	8	Neural Crest	1	1
7	Canine - lateral extreme - right	1	1	1	8	Neural Crest	1	1
8	Canine - mesial extreme - right	1	1	1	8	Neural Crest	1	1
9	Palatine - Maxilla - ventral suture	1	1	2	2	Neural Crest	1	2
10	Maxilla - Palatine lateral suture - left	1	1	2	2	Neural Crest	1	2

11	Maxilla - Palatine lateral suture - right	1	1	2	2	Neural Crest	1	2
12	Anterior P1 - left	1	1	2	2	Neural Crest	1	2
13	Anterior P1 - right	1	1	2	2	Neural Crest	1	2
14	Nasals - anterior midline extreme	1	2	1	1	Neural Crest	2	1
15	Nasals - Frontal midline suture	1	3	3	3	Mixed	Unint.	Unint.
16	Nasal - Premaxilla suture - left	1	2	1	1	Neural Crest	2	1
17	Nasal - Premaxilla suture- right	1	2	1	1	Neural Crest	2	1
18	Jugal - Maxilla (Orbit crest) suture - left	1	3	3	3	Mixed	Unint.	Unint.
19	Jugal - Maxilla (Orbit crest) suture - right	1	3	3	3	Mixed	Unint.	Unint.
20	Lacrimal - Frontal - Maxilla suture - left	1	3	3	3	Mixed	Unint.	Unint.
21	Ethmoid - Lacrimal - Frontal suture - left	1	3	3	3	Mixed	Unint.	Unint.
22	Lacrimal - Frontal - Maxilla suture - right	1	3	3	3	Mixed	Unint.	Unint.
23	Ethmoid - Lacrimal - Frontal suture - right	1	3	3	3	Mixed	Unint.	Unint.
24	Maxilla - Jugal posterior interior suture - left	1	4	3	4	Mixed	Unint.	Unint.
25	Maxilla - Jugal posterior interior suture - right	1	4	3	4	Mixed	Unint.	Unint.
26	Sphenoid - Jugal - Frontal interior suture - left	1	4	3	3	Mixed	Unint.	Unint.
27	Sphenoid - Jugal - Frontal interior suture - right	1	4	3	3	Mixed	Unint.	Unint.
28	Jugal - Maxilla (base of zygomatic arch) suture - left	1	4	2	4	Mixed	Unint.	2
29	Jugal - Maxilla (base of zygomatic arch) suture - right	1	4	2	4	Mixed	Unint.	2
30	Jugal - Frontal (postorbital bar) suture - left	1	3	3	3	Mixed	Unint.	Unint.
31	Jugal - Frontal (postorbital bar) suture - right	1	3	3	3	Mixed	Unint.	Unint.
32	Jugal - Squamosal dorsal suture - left	1	4	4	4	Mixed	Unint.	Unint.

33	Jugal - Squamosal dorsal suture - right	1	4	4	4	Mixed	Unint.	Unint.
34	Jugal - Squamosal ventral suture - left	1	4	4	4	Mixed	Unint.	Unint.
35	Jugal - Squamosal ventral suture - right	1	4	4	4	Mixed	Unint.	Unint.
36	Parietal - Frontal suture	2	5	5	5	Mixed	Unint.	Unint.
37	Parietal - Squamosal - Frontal suture - left	2	5	5	5	Mixed	Unint.	Unint.
38	Parietal - Squamosal - Frontal suture - right	2	5	5	5	Mixed	Unint.	Unint.
39	Parietal - Squamosal - Occipital suture - left	2	5	4	5	Mixed	Unint.	Unint.
40	Parietal - Squamosal - Occipital suture - right	2	5	4	5	Mixed	Unint.	Unint.
41	Jugal - Frontal - Alisphenoid suture - left	2	4	5	5	Mixed	Unint.	Unint.
42	Jugal - Frontal - Alisphenoid suture - right	2	4	5	5	Mixed	Unint.	Unint.
43	Frontal - Sphenoid - Squamosal suture - left	2	4	5	5	Mixed	Unint.	Unint.
44	Frontal - Sphenoid - Squamosal suture - right	2	4	5	5	Mixed	Unint.	Unint.
45	Pterygoid tip lateral - left	2	6	4	7	Mixed	6	Unint.
46	Pterygoid tip lateral- - right	2	6	4	7	Mixed	6	Unint.
47	Pterygoid tip medial - left	2	6	4	7	Mixed	6	Unint.
48	Pterygoid tip medial - right	2	6	4	7	Mixed	6	Unint.
49	Presphenoid - Palatine - Alisphenoid suture - left	2	6	4	7	Mixed	6	Unint.
50	Presphenoid - Palatine - Alisphenoid suture - right	2	6	4	7	Mixed	6	Unint.
51	Basisphenoid - Presphenoid - Alisphenoid suture - left	2	6	4	7	Mixed	6	Unint.
52	Basisphenoid - Presphenoid - Alisphenoid suture - right	2	6	4	7	Mixed	6	Unint.
53	Basioccipital-Basisphenoid-Bulla suture - left	2	6	6	6	Mesodermal	6	6
54	Basioccipital-Basisphenoid-Bulla suture - right	2	6	6	6	Mesodermal	6	6

55	Bulla anterior medial extreme - left	2	6	6	6	Mesodermal	6	6
56	Bulla anterior medial extreme - right	2	6	6	6	Mesodermal	6	6
57	Bulla posterior lateral extreme - left	2	6	6	6	Mesodermal	6	6
58	Bulla posterior lateral extreme - right	2	6	6	6	Mesodermal	6	6
59	Parietals - Occipital suture	2	5	4	5	Mixed	Unint.	Unint.
60	Occipital condyle - extreme - left	2	6	6	6	Mesodermal	6	6
61	Occipital condyle - extreme - right	2	6	6	6	Mesodermal	6	6

Table S2: Results for the Adult Male data set (n=25) using congruence coefficients. Model parameters, raw log-likelihood fits for each tested model, AIC_c and ΔAIC_c scores are provided. Model log-likelihoods and the model posterior probability are also shown. Sample size used to calculate AIC_c was 1830. See methods for details. Model ID's correspond to the numbering in Table 1. The optimal model in the set of evaluated models is highlighted in bold italics.

Model ID	K	LogL	AIC_c	ΔAIC_c	Model LogL	Model Post. Prob.
1	2	2175.77	-4347.53	335.29	1.56E-73	1.56E-73
2	3	2221.21	-4436.40	246.42	3.10E-54	3.10E-54
3	4	2228.99	-4449.96	232.85	2.73E-51	2.73E-51
4	3	2245.09	-4484.17	198.64	7.33E-44	7.33E-44
5	8	2310.25	-4604.43	78.39	9.50E-18	9.50E-18
6	17	2298.53	-4562.72	120.10	8.34E-27	8.34E-27
7	***22***	***2363.69***	***-4682.82***	***0.00***	***1.00***	***1.000***
8	3	2211.58	-4417.14	265.68	2.04E-58	2.04E-58
9	8	2256.30	-4496.53	186.29	3.53E-41	3.53E-41
10	17	2258.68	-4483.01	199.80	4.10E-44	4.10E-44
11	22	2303.40	-4562.25	120.57	6.58E-27	6.58E-27
12	3	2217.10	-4428.18	254.63	5.09E-56	5.09E-56
13	10	2247.77	-4475.41	207.40	9.18E-46	9.18E-46
14	30	2304.49	-4547.94	134.87	5.16E-30	5.16E-30
15	37	2335.16	-4594.75	88.07	7.52E-20	7.52E-20
16	3	2176.94	-4347.86	334.95	1.84E-73	1.84E-73
17	5	2257.53	-4505.03	177.79	2.48E-39	2.48E-39
18	5	2186.56	-4363.08	319.74	3.72E-70	3.72E-70
19	7	2267.15	-4520.24	162.58	4.97E-36	4.97E-36
20	3	2260.27	-4514.53	168.29	2.86E-37	2.86E-37
21	4	2260.68	-4513.34	169.47	1.58E-37	1.58E-37
22	5	2294.69	-4579.34	103.48	3.39E-23	3.39E-23
23	6	2295.10	-4578.15	104.67	1.87E-23	1.87E-23
24	6	2267.15	-4522.26	160.56	1.37E-35	1.37E-35
25	8	2301.57	-4587.06	95.76	1.61E-21	1.61E-21
26	3	2241.96	-4477.91	204.90	3.20E-45	3.20E-45
27	4	2243.42	-4478.81	204.01	5.02E-45	5.02E-45

28	5	2251.07	-4492.10	190.72	3.86E-42	3.86E-42
29	6	2252.52	-4492.99	189.82	6.03E-42	6.03E-42
30	6	2251.53	-4491.01	191.81	2.24E-42	2.24E-42
31	8	2260.63	-4505.18	177.63	2.68E-39	2.68E-39

Table S3: Results for the Adult Female data set (n=24) using congruence coefficients. Model parameters, raw log-likelihood fits for each tested model, AIC_c and ΔAIC_c scores are provided. Model log-likelihoods and the model posterior probability are also shown. Sample size used to calculate AIC_c was 1830. See methods for details. Model ID's correspond to the numbering in Table 1. The optimal model in the set of evaluated models is highlighted in bold italics.

Model ID	K	LogL	AIC_c	ΔAIC_c	Model LogL	Model Post. Prob.
1	2	2078.86	-4153.72	916.21	1.11E-199	1.11E-199
2	3	2134.49	-4262.97	806.96	5.89E-176	5.89E-176
3	4	2147.54	-4287.06	782.88	1.00E-170	1.00E-170
4	3	2219.34	-4432.67	637.26	4.17E-139	4.17E-139
5	8	2380.83	-4745.58	324.35	3.69E-71	3.69E-71
6	17	2395.76	-4757.18	312.75	1.22E-68	1.22E-68
7	***22***	***2557.25***	***-5069.93***	***0.00***	***1.00***	***1.000***
8	3	2153.94	-4301.87	768.06	1.65E-167	1.65E-167
9	8	2226.56	-4437.03	632.90	3.69E-138	3.69E-138
10	17	2257.63	-4480.93	589.01	1.26E-128	1.26E-128
11	22	2330.25	-4615.93	454.00	2.60E-99	2.60E-99
12	3	2172.35	-4338.69	731.24	1.63E-159	1.63E-159
13	10	2246.04	-4471.95	597.98	1.41E-130	1.41E-130
14	30	2417.44	-4773.85	296.09	5.07E-65	5.07E-65
15	37	2491.12	-4906.68	163.26	3.54E-36	3.54E-36
16	3	2079.47	-4152.93	917.00	7.50E-200	7.50E-200

17	5	2214.56	-4419.08	650.85	4.67E-142	4.67E-142
18	5	2109.73	-4209.43	860.51	1.39E-187	1.39E-187
19	7	2244.82	-4475.57	594.36	8.62E-130	8.62E-130
20	3	2262.47	-4518.93	551.01	2.24E-120	2.24E-120
21	4	2265.54	-4523.05	546.88	1.76E-119	1.76E-119
22	5	2324.39	-4638.75	431.18	2.34E-94	2.34E-94
23	6	2327.46	-4642.87	427.06	1.84E-93	1.84E-93
24	6	2286.11	-4560.17	509.76	2.03E-111	2.03E-111
25	8	2348.03	-4679.99	389.95	2.11E-85	2.11E-85
26	3	2181.12	-4356.23	713.70	1.05E-155	1.05E-155
27	4	2181.12	-4354.23	715.71	3.85E-156	3.85E-156
28	5	2204.15	-4398.27	671.66	1.42E-146	1.42E-146
29	6	2204.15	-4396.26	673.67	5.17E-147	5.17E-147
30	6	2195.90	-4379.76	690.18	1.35E-150	1.35E-150
31	8	2218.93	-4421.78	648.15	1.80E-141	1.80E-141

Table S4: Results for the Juvenile (M1 erupted) data set (n=42) using congruence coefficients. Model parameters, raw log-likelihood fits for each tested model, AIC_c and ΔAIC_c scores are provided. Model log-likelihoods and the model posterior probability are also shown. Sample size used to calculate AIC_c was 1830. See methods for details. Model ID's correspond to the numbering in Table 1. The optimal model in the set of evaluated models is highlighted in bold italics.

Model ID	K	LogL	AIC_c	ΔAIC_c	Model LogL	Model Post. Prob.
1	2	2370.87	-4737.74	578.45	2.47E-126	2.47E-126
2	3	2401.99	-4797.96	518.23	2.94E-113	2.94E-113
3	4	2401.99	-4795.95	520.24	1.08E-113	1.08E-113
4	3	2497.10	-4988.19	328.00	5.97E-72	5.97E-72
5	8	2620.86	-5225.63	90.56	2.17E-20	2.17E-20
6	17	2556.62	-5078.90	237.28	2.98E-52	2.98E-52
7	***22***	***2680.37***	***-5316.19***	***0.00***	***1.00***	***1.000***
8	3	2426.61	-4847.21	468.98	1.46E-102	1.46E-102
9	8	2491.29	-4966.49	349.69	1.16E-76	1.16E-76
10	17	2486.80	-4939.26	376.93	1.41E-82	1.41E-82
11	22	2551.47	-5058.38	257.81	1.04E-56	1.04E-56
12	3	2427.43	-4848.84	467.35	3.29E-102	3.29E-102
13	10	2521.49	-5022.85	293.33	2.01E-64	2.01E-64
14	30	2575.48	-5089.93	226.26	7.40E-50	7.40E-50
15	37	2669.54	-5263.52	52.67	3.65E-12	3.65E-12
16	3	2373.02	-4740.03	576.15	7.76E-126	7.76E-126
17	5	2498.93	-4987.83	328.36	4.98E-72	4.98E-72
18	5	2377.82	-4745.60	570.58	1.26E-124	1.26E-124
19	7	2503.72	-4993.39	322.80	8.03E-71	8.03E-71
20	3	2570.70	-5135.39	180.80	5.49E-40	5.49E-40
21	4	2582.24	-5156.45	159.74	2.06E-35	2.06E-35
22	5	2618.04	-5226.05	90.14	2.67E-20	2.67E-20
23	6	2629.57	-5247.10	69.08	9.97E-16	9.97E-16
24	6	2584.75	-5157.46	158.73	3.41E-35	3.41E-35
25	8	2632.09	-5248.11	68.08	1.65E-15	1.65E-15
26	3	2446.94	-4887.87	428.32	9.80E-94	9.80E-94
27	4	2451.77	-4895.51	420.68	4.48E-92	4.48E-92

28	5	2465.94	-4921.85	394.34	2.35E-86	2.35E-86
29	6	2470.77	-4929.49	386.70	1.07E-84	1.07E-84
30	6	2461.70	-4911.35	404.84	1.23E-88	1.23E-88
31	8	2480.70	-4945.32	370.86	2.94E-81	2.94E-81

Table S5: Results for the Infant (deciduous dentition only) data set (n=42) using congruence coefficients. Model parameters, raw log-likelihood fits for each tested model, AIC_c and ΔAIC_c scores are provided. Model log-likelihoods and the model posterior probability are also shown. Sample size used to calculate AIC_c was 1830. See methods for details. Model ID's correspond to the numbering in Table 1. The optimal model in the set of evaluated models is highlighted in bold italics.

Model ID	K	LogL	AIC_c	ΔAIC_c	Model LogL	Model Post. Prob.
1	2	2015.51	-4027.02	923.56	2.83E-201	2.83E-201
2	3	2038.25	-4070.49	880.09	7.78E-192	7.78E-192
3	4	2053.90	-4099.78	850.79	1.79E-185	1.79E-185
4	3	2120.12	-4234.23	716.35	2.80E-156	2.80E-156
5	8	2327.91	-4639.75	310.83	3.19E-68	3.19E-68
6	17	2289.78	-4545.22	405.36	9.48E-89	9.48E-89
7	***22***	***2497.57***	***-4950.58***	***0.00***	***1.00***	***1.000***
8	3	2048.56	-4091.11	859.47	2.34E-187	2.34E-187
9	8	2147.33	-4278.58	672.00	1.19E-146	1.19E-146
10	17	2183.26	-4332.19	618.39	5.23E-135	5.23E-135
11	22	2282.03	-4519.50	431.07	2.47E-94	2.47E-94
12	3	2046.33	-4086.64	863.94	2.50E-188	2.50E-188
13	10	2186.52	-4352.92	597.66	1.66E-130	1.66E-130
14	30	2315.57	-4570.11	380.47	2.41E-83	2.41E-83
15	37	2455.77	-4835.96	114.61	1.29E-25	1.29E-25
16	3	2016.76	-4027.51	923.07	3.62E-201	3.62E-201
17	5	2202.45	-4394.86	555.72	2.13E-121	2.13E-121
18	5	2049.95	-4089.86	860.72	1.25E-187	1.25E-187
19	7	2235.63	-4457.20	493.38	7.33E-108	7.33E-108
20	3	2218.66	-4431.30	519.28	1.74E-113	1.74E-113
21	4	2237.35	-4466.69	483.89	8.39E-106	8.39E-106
22	5	2324.18	-4638.32	312.26	1.56E-68	1.56E-68
23	6	2342.87	-4673.70	276.88	7.53E-61	7.53E-61
24	6	2282.04	-4552.03	398.55	2.86E-87	2.86E-87
25	8	2387.56	-4759.04	191.54	2.56E-42	2.56E-42
26	3	2116.35	-4226.70	723.88	6.47E-158	6.47E-158
27	4	2160.11	-4312.20	638.38	2.39E-139	2.39E-139

28	5	2141.88	-4273.73	676.85	1.06E-147	1.06E-147
29	6	2185.64	-4359.23	591.35	3.90E-129	3.90E-129
30	6	2179.53	-4347.02	603.56	8.68E-132	8.68E-132
31	8	2205.06	-4394.04	556.54	1.41E-121	1.41E-121

Table S6: Results for the Juvenile (M1 erupted) data set (n=42) using congruence coefficients for individual x-, y-, and z-coordinates. Model parameters, raw log-likelihood fits for each tested model, AIC_c and ΔAIC_c scores are provided. Model log-likelihoods and the model posterior probability are also shown. Sample size used to calculate AIC_c was 16653. See methods for details. Model ID's correspond to the numbering in Table 1. The optimal model in the set of evaluated models is highlighted in bold italics.

Model ID	K	LogL	AIC_c	ΔAIC_c	Model LogL	Model Post. Prob.
1	2	20945.27	-41886.54	941.41	3.75E-205	3.75E-205
2	3	20984.40	-41962.79	865.17	1.35E-188	1.35E-188
3	4	20988.41	-41968.81	859.15	2.75E-187	2.75E-187
4	3	21151.61	-42297.23	530.73	5.67E-116	5.67E-116
5	8	21282.48	-42548.96	279.00	2.61E-61	2.61E-61
6	17	21305.14	-42576.24	251.71	2.19E-55	2.19E-55
7	***22***	21436.01	-42827.96	0.00	1.00	1.000
8	3	21034.66	-42063.31	764.65	9.10E-167	9.10E-167
9	8	21095.65	-42175.30	652.66	1.89E-142	1.89E-142
10	17	21118.13	-42202.23	625.73	1.33E-136	1.33E-136
11	22	21179.13	-42314.20	513.76	2.75E-112	2.75E-112
12	3	21084.55	-42163.10	664.86	4.24E-145	4.24E-145
13	10	21158.55	-42297.09	530.86	5.30E-116	5.30E-116
14	30	21312.40	-42564.68	263.28	6.76E-58	6.76E-58
15	37	21386.40	-42698.63	129.33	8.26E-29	8.26E-29
16	3	20945.27	-41884.54	943.41	1.38E-205	1.38E-205
17	5	21096.60	-42183.21	644.75	9.87E-141	9.87E-141
18	5	20968.11	-41926.22	901.73	1.55E-196	1.55E-196
19	7	21119.45	-42224.89	603.07	1.11E-131	1.11E-131
20	3	21133.24	-42260.48	567.47	5.96E-124	5.96E-124
21	4	21133.24	-42258.48	569.47	2.19E-124	2.19E-124
22	5	21229.87	-42449.74	378.21	7.44E-83	7.44E-83
23	6	21229.87	-42447.74	380.22	2.74E-83	2.74E-83
24	6	21156.37	-42300.73	527.23	3.27E-115	3.27E-115
25	8	21253.00	-42489.99	337.97	4.08E-74	4.08E-74
26	3	21030.26	-42054.51	773.44	1.12E-168	1.12E-168
27	4	21042.91	-42077.82	750.14	1.29E-163	1.29E-163

28	5	21035.66	-42061.31	766.65	3.34E-167	3.34E-167
29	6	21048.31	-42084.61	743.34	3.84E-162	3.84E-162
30	6	21058.04	-42104.08	723.88	6.48E-158	6.48E-158
31	8	21063.44	-42110.87	717.09	1.93E-156	1.93E-156

Table S7: Results for the red fox, *Vulpes vulpes*, adult data set (n=22) using congruence coefficients for 55 landmarks, detailed in (Goswami 2006b). Model parameters, raw log-likelihood fits for each tested model, AIC_c and ΔAIC_c scores are provided. Model log-likelihoods and the model posterior probability are also shown. Sample size used to calculate AIC_c was 1485. See methods for details. Model ID's correspond to the numbering in Table 1. The 8-module model was not included, due to fewer landmarks in the fox dataset rendering some modules too small to analyze meaningfully. The optimal model in the set of evaluated models is highlighted in bold italics.

Model ID	K	LogL	AIC_c	ΔAIC_c	Model LogL	Model Post. Prob.
1	2	462.6197	-921.231	1861.943	0	0
2	3	462.6197	-919.223	1863.951	0	0
3	4	494.106	-980.185	1802.99	0	0
4	3	534.5225	-1063.03	1720.146	0	0
5	8	746.222	-1476.35	1306.828	1.68E-284	1.68E-284
6	17	1043.7	-2052.98	730.1918	2.76E-159	2.76E-159
7	22	1255.4	-2466.11	317.0679	1.41E-69	1.41E-69
8	3	551.5688	-1097.12	1686.053	0	0
9	8	970.3137	-1924.53	858.6449	3.53E-187	3.53E-187
10	17	995.1886	-1955.96	827.2147	2.36E-180	2.36E-180
11	***22***	***1413.933***	***-2783.17***	***0***	***1***	***1***
16	3	463.084	-920.152	1863.023	0	0
17	5	847.2522	-1684.46	1098.711	2.62E-239	2.62E-239
18	5	561.2773	-1112.51	1670.661	0	0
19	7	945.4455	-1876.82	906.3596	1.54E-197	1.54E-197
20	3	594.9729	-1183.93	1599.245	0	0
21	4	767.7127	-1527.4	1255.776	2.05E-273	2.05E-273
22	5	704.1936	-1398.35	1384.828	1.94E-301	1.94E-301
23	6	876.9334	-1741.81	1041.365	7.42E-227	7.42E-227
24	6	822.5601	-1633.06	1150.111	1.81E-250	1.81E-250
25	8	931.7808	-1847.46	935.7106	6.50E-204	6.50E-204
26	3	754.149	-1502.28	1280.893	7.20E-279	7.20E-279
27	4	841.7608	-1675.49	1107.68	2.95E-241	2.95E-241
28	5	952.0534	-1894.07	889.1084	8.56E-194	8.56E-194
29	6	1039.665	-2067.27	715.9011	3.50E-156	3.50E-156

30	6	922.2105	-1832.36	950.8106	3.42E-207	3.42E-207
31	8	1120.115	-2224.13	559.0424	4.03E-122	4.03E-122

References

Cheverud, J. M. 1995. Morphological integration in the saddle-back tamarin (Saguinus fuscicollis) cranium. Am. Nat. 145:63-89.

Drake, A. G. and C. P. Klingenberg. 2010. Large-scale diversification of skull shape in domestic dogs: disparity and modularity. Am. Nat. 175:289-301.

Goswami, A. 2006a. Cranial modularity shifts during mammalian evolution. Am. Nat. 168:270-280.

Goswami, A. 2006b. Morphological integration in the carnivoran skull. Evolution 60:169-183.

Goswami, A. and P. D. Polly. 2010. Methods for studying morphological integration and modularity. Pp. 213-243 *in* J. Alroy, and E. G. Hunt, eds. Quantitative Methods in Paleobiology. The Paleontological Society, Boulder, CO.