

File S1 Model evaluation for GWAS

$$y_i = \mu + \beta_{i,j} \times (g_i \times \text{kin})$$

where g is the genotype of the individual i , kin is the kinship matrix, μ is the grand population mean (intercept) and β_j are the relevant covariates

β_1	Stud farm
β_2	Birth year category
β_3	Age Category
β_4	Sex
β_5	Head height
β_6	Head in relation to the camera
β_7	Position of front limb
β_8	Position of hind limb
β_9	Body alignment to the camera
B_{10}	Tail position

S1.1 Poll angle

Summary of fixed effects estimates

	Estimate	SE	t-value	p-value
<i>Intercept</i>	104.61906	2.48205	42.150	<0.0001
Stud farm	-0.02361	0.34505	-0.068	0.94548
Birth year category	-0.45611	0.32852	-1.388	0.16598
Age category	0.63858	0.19954	3.200	0.00151
Sex	1.28069	0.60799	2.106	0.03594
Head height	-0.82122	0.58836	-1.396	0.16375
Head in relation to the camera	0.73798	0.23912	3.086	0.00220
Position of front limb	-0.04052	0.23783	-0.170	0.86483
Position of hind limb	0.20609	0.24673	0.835	0.40417
Body alignment to the camera	-0.65229	0.31906	-2.044	0.04172
Tail position	-1.72304	0.54136	-3.183	0.00160

S1.2 Elbow joint angle

Summary of fixed effects estimates

	Estimate	SE	t-value	p-value
<i>Intercept</i>	141.2325	3.0331	46.564	< 0.0001
Stud farm	0.4934	0.4135	1.193	0.23358
Birth year category	0.5727	0.4015	1.426	0.15476
Age category	-0.3879	0.2443	-1.588	0.11329
Sex	-1.4567	0.7437	-1.959	0.05098
Head height	-1.3872	0.7206	-1.925	0.05506
Head in relation to the camera	-0.2896	0.293	-0.988	0.3238
Position of front limb	-1.6461	0.2911	-5.655	<0.0001
Position of hind limb	-0.54	0.3021	-1.787	0.07479
Body alignment to the camera	-1.0562	0.3909	-2.702	0.00725
Tail position	0.3991	0.6625	0.602	0.54727

S1.3 Carpal joint angle

Summary of fixed effects estimates

	Estimate	SE	t-value	p-value
<i>Intercept</i>	176.2778	0.894609	197.045	< 0.0001
Stud farm	0.023023	0.123869	0.186	0.853
Birth year category	-0.00251	0.118413	-0.021	0.983
Age category	0.090519	0.071949	1.258	0.209
Sex	1.0416	0.21918	4.752	< 0.0001
Head height	-0.04098	0.212162	-0.193	0.847
Head in relation to the camera	-0.15851	0.086236	-1.838	0.067
Position of front limb	0.009347	0.085749	0.109	0.91
Position of hind limb	0.102076	0.088966	1.147	0.252
Body alignment to the camera	0.15116	0.11506	1.314	0.19
Tail position	-0.1521	0.19518	-0.779	0.436

S1.4 Fetlock joint angle of the forelimb

Summary of fixed effects estimates

	Estimate	SE	t-value	p-value
<i>Intercept</i>	146.8066	2.13286	68.831	< 0.0001
Stud farm	0.28005	0.29437	0.951	0.34212
Birth year category	-0.23838	0.28232	-0.844	0.3991
Age category	0.15338	0.17158	0.894	0.37204
Sex	1.5692	0.52263	3.002	0.00289
Head height	0.09664	0.506	0.191	0.84865
Head in relation to the camera	-0.07419	0.20569	-0.361	0.71857
Position of front limb	0.30341	0.20449	1.484	0.14
Position of hind limb	0.53665	0.21218	2.529	0.0119
Body alignment to the camera	-0.41089	0.27443	-1.497	0.1353
Tail position	-0.18696	0.46544	-0.402	0.68818

S1.5 Hip joint angle

Summary of fixed effects estimates

	Estimate	SE	t-value	p-value
<i>Intercept</i>	82.63606	1.39918	59.061	< 0.0001
Stud farm	-0.09943	0.19169	-0.519	0.60431
Birth year category	-0.6051	0.18522	-3.267	0.001202
Age category	-0.15258	0.11263	-1.355	0.176472
Sex	-0.7404	0.34298	-2.159	0.031593
Head height	-0.2887	0.33222	-0.869	0.385474
Head in relation to the camera	0.06353	0.13508	0.47	0.63842
Position of front limb	-0.06525	0.13423	-0.486	0.63
Position of hind limb	-1.85089	0.13929	-13.288	< 0.0001
Body alignment to the camera	0.63432	0.1802	3.52	0.000492
Tail position	0.5177	0.30549	1.695	0.091088

S1.6 Stifle joint angle

Summary of fixed effects estimates

	Estimate	SE	t-value	p-value
<i>Intercept</i>	86.3356	1.8994	45.454	< 0.0001
Stud farm	0.2866	0.2631	1.089	0.276818
Birth year category	0.2539	0.2514	1.01	0.313351
Age category	0.5486	0.1528	3.592	0.000379
Sex	-0.3919	0.4653	-0.842	0.400278
Head height	0.4822	0.4504	1.07	0.285198
Head in relation to the camera	0.4427	0.1831	2.418	0.016149
Position of front limb	0.1138	0.1821	0.625	0.53
Position of hind limb	1.9411	0.1889	10.277	<0.0001
Body alignment to the camera	1.3655	0.2443	5.59	<0.0001
Tail position	0.6183	0.4144	1.492	0.136622

S1.7 Hock angle

Summary of fixed effects estimates

	Estimate	SE	t-value	p-value
<i>Intercept</i>	153.6902	1.15834	132.681	< 0.0001
Stud farm	0.03015	0.15974	0.189	0.8504
Birth year category	0.10144	0.15333	0.662	0.5087
Age category	0.10509	0.09319	1.128	0.2603
Sex	0.48366	0.28385	1.704	0.0894
Head height	-0.0679	0.27483	-0.247	0.805
Head in relation to the camera	0.13307	0.11172	1.191	0.2345
Position of front limb	-0.06313	0.11107	-0.568	0.57
Position of hind limb	-1.08524	0.11524	-9.417	< 0.0001
Body alignment to the camera	0.24681	0.14906	1.656	0.0987
Tail position	0.1087	0.25279	0.43	0.6675

S1.8 Fetlock joint angle of the hind limb

Summary of fixed effects estimates

	Estimate	SE	t-value	p-value
<i>Intercept</i>	159.8484	2.55466	62.571	< 0.0001
Stud farm	0.71303	0.35974	1.982	0.04834
Birth year category	0.04059	0.33806	0.12	0.9045
Age category	0.22598	0.20512	1.102	0.27144
Sex	1.18081	0.62537	1.888	0.05992
Head height	-0.4693	0.60467	-0.776	0.43826
Head in relation to the camera	-0.25714	0.24564	-1.047	0.29598
Position of front limb	-1.18611	0.2445	-4.851	< 0.0001
Position of hind limb	-0.73777	0.25361	-2.909	0.00388
Body alignment to the camera	0.2483	0.32782	0.757	0.44936
Tail position	-0.89216	0.55668	-1.603	0.11001