

Edwards_HW1

Alex Edwards

September 14, 2016

Homework #1 Based on the fms data, determine whether any of the twenty-four akt1 SNPs are associated with NDRM.CH (percentage change in non-dominant arm muscle strength). Perform both unadjusted and adjusted (age and gender) analyses in Caucasians. State clearly how you code all variables (phenotypic and genotypic) and justify the approach. Summarize the test statistics of all akt1 SNPs in tables (one table for each model).

Data Manipulation

First, we must subset the FMS data set to only include caucasians.

```
causFMS <- filter(fms, Race == "Caucasian")
```

Second, we must isolate only the 24 *akt1* SNPs, gender, age, and our outcome NDRM.CH.

```
finalFMS <- select(causFMS, contains("AKT1"), Gender, Age, NDRM.CH)
```

Lastly, we are dealing with multilevel factors for all of our data except age and NDRM.CH. Therefore, all factor data will be re-coded as numeric factors 0- N with N being the maximum number of factors. For example, gender is recoded as 0 for female and 1 for male; whereas, the SNPs are coded 0, 1, or 2 depending on composition. This allows us to contrast our models by completely excluding, through the coding of the 0, any levels that we wish to adjust for. As expected, age and NDRM.CH remain unchanged since they are continuous variables.

```
finalFMS[, 1:25] <- sapply(finalFMS[, 1:25], as.numeric)-1
```

Phenotype Model

This model includes all *akt1* SNPs and the phenotypic adjustments.

```
withPheno <- lm( NDRM.CH ~ . , data=finalFMS )
```

Non-Phenotype Model

First, we remove the phenotype variables from the data set

```
finalFMS = subset(finalFMS, select = -c(Age, Gender) )
```

Now, using the dataset we just created we model all *akt1* SNPs while excluding all phenotypic variables.

```
withoutPheno <- lm( NDRM.CH ~ . , data=finalFMS )
```

Results Table

	NDRM.CH With Phenotype			NDRM.CH Without Phenotype		
	<i>B</i>	<i>CI</i>	<i>p</i>	<i>B</i>	<i>CI</i>	<i>p</i>
(Intercept)	44.30	-30.69 – 119.29	.246	-15.69	-97.15 – 65.78	.706
akt1_t22932c	-1.05	-8.79 – 6.70	.791	2.24	-6.27 – 10.75	.606
akt1_g15129a	10.16	-1.75 – 22.07	.094	11.48	-1.64 – 24.60	.086
akt1_g14803t	2.70	-9.95 – 15.35	.675	1.62	-12.31 – 15.55	.819
akt1_c10744t_c12886t	-0.51	-31.62 – 30.59	.974	7.32	-26.90 – 41.55	.674
akt1_t10726c_t12868c	22.58	11.21 – 33.94	<.001	25.55	13.08 – 38.01	<.001
akt1_t10598a_t12740a	-3.98	-15.13 – 7.16	.483	-0.58	-12.84 – 11.68	.926
akt1_c9756a_c11898t	14.39	-14.54 – 43.32	.329	12.30	-19.55 – 44.16	.449
akt1_t8407g	-10.87	-25.19 – 3.46	.137	-7.20	-22.97 – 8.56	.370
akt1_a7699g	28.57	9.75 – 47.39	.003	24.96	4.25 – 45.67	.018
akt1_c6148t_c8290t	-1.39	-15.42 – 12.63	.845	-9.34	-24.71 – 6.02	.233
akt1_c6024t_c8166t	-19.96	-48.57 – 8.65	.171	-22.72	-54.22 – 8.79	.157
akt1_c5854t_c7996t	4.17	-4.46 – 12.79	.343	3.29	-6.16 – 12.74	.494
akt1_c832g_c3359g	-4.08	-17.71 – 9.56	.557	-4.44	-19.46 – 10.57	.562
akt1_g288c	0.80	-6.76 – 8.37	.835	2.35	-5.98 – 10.67	.580
akt1_g1780a_g363a	-12.16	-47.64 – 23.32	.501	0.32	-38.70 – 39.34	.987
akt1_g2347t_g205t	6.51	-2.44 – 15.47	.154	5.29	-4.54 – 15.12	.291
akt1_g2375a_g233a	1.49	-7.71 – 10.69	.751	1.66	-8.44 – 11.77	.747
akt1_g4362c	2.32	-11.38 – 16.03	.739	2.56	-12.53 – 17.65	.739
akt1_c15676t	1.86	-5.24 – 8.95	.608	1.56	-6.25 – 9.37	.696
akt1_a15756t	2.87	-4.25 – 10.00	.429	0.52	-7.30 – 8.35	.895
akt1_g20703a	1.64	-3.72 – 7.00	.549	0.81	-5.09 – 6.71	.787
akt1_g22187a	-0.28	-6.39 – 5.83	.929	1.90	-4.80 – 8.60	.578
akt1_a22889g	-0.76	-6.97 – 5.45	.810	0.19	-6.65 – 7.03	.957
akt1_g23477a	-0.91	-8.14 – 6.32	.805	0.44	-7.48 – 8.37	.913
Gender	-24.69	-29.36 – -20.02	<.001			
Age	-1.34	-1.78 – -0.91	<.001			
Observations	701			707		
R ² / adj. R ²	.217 / .187			.046 / .012		