

Interaction models

Peru example

R code

```
# R code for PERU example, interaction models
peru=read.table("C:/Users/Mihinda/Desktop/peru.txt",
header=1) #the data file
peru$FRAC=peru$YEARS/peru$AGE
peru
par(mfrow=c(2,1))
plot(peru$FRAC, peru$SYSTOL)
plot(peru$WEIGHT, peru$SYSTOL)

fit1 <- lm(SYSTOL ~ FRAC + WEIGHT, data=peru)
summary(fit1) # show results
anova(fit1)
fit2 <- lm(SYSTOL ~ FRAC*WEIGHT, data=peru)
summary(fit2) # show results
anova(fit2)
```

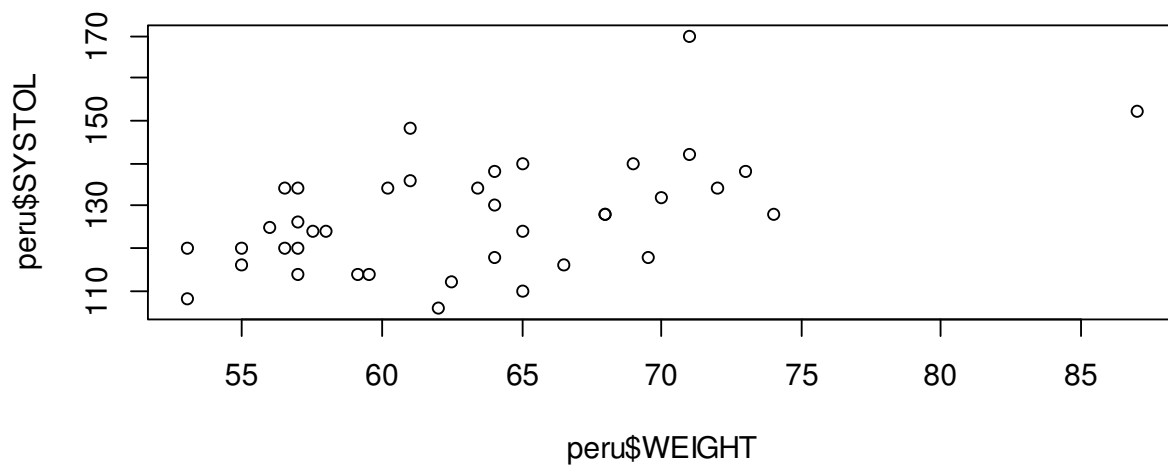
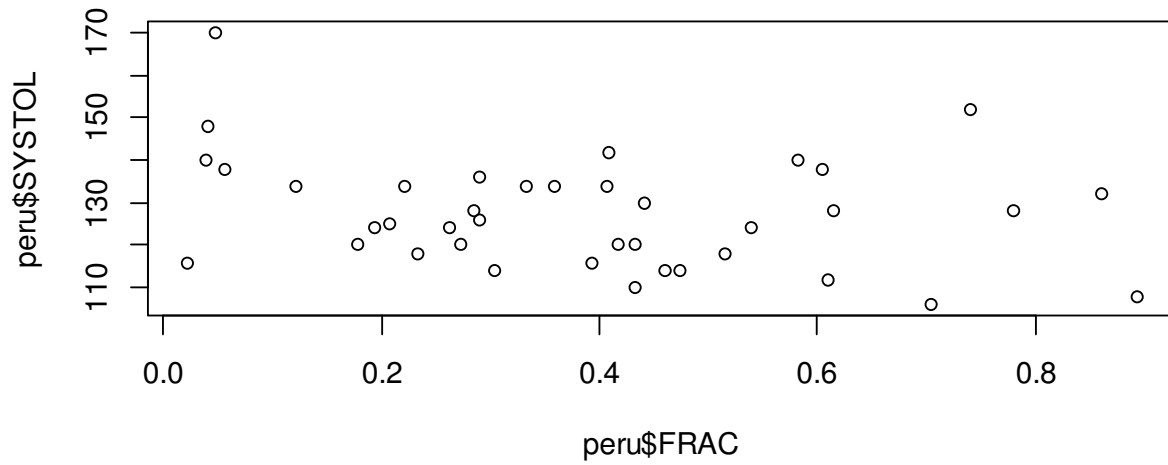
```

> # R code for PERU example, interaction models
> peru=read.table("C:/Users/Mihinda/Desktop/peru.txt",
header=1) #the data file
> peru$FRAC=peru$YEARS/peru$AGE
> peru

```

	Row	SYSTOL	YEARS	AGE	WEIGHT	FRAC
1	1	170	1	21	71.0	0.04761905
2	2	120	6	22	56.5	0.27272727
3	3	125	5	24	56.0	0.20833333
4	4	148	1	24	61.0	0.04166667
5	5	140	1	25	65.0	0.04000000
6	6	106	19	27	62.0	0.70370370
7	7	120	5	28	53.0	0.17857143
8	8	108	25	28	53.0	0.89285714
9	9	124	6	31	65.0	0.19354839
10	10	134	13	32	57.0	0.40625000
11	11	116	13	33	66.5	0.39393939
12	12	114	10	33	59.1	0.30303030
13	13	130	15	34	64.0	0.44117647
14	14	118	18	35	69.5	0.51428571
15	15	138	2	35	64.0	0.05714286
16	16	134	12	36	56.5	0.33333333
17	17	120	15	36	57.0	0.41666667
18	18	120	16	37	55.0	0.43243243
19	19	114	17	37	57.0	0.45945946
20	20	124	10	38	58.0	0.26315789
21	21	114	18	38	59.5	0.47368421
22	22	136	11	38	61.0	0.28947368
23	23	126	11	38	57.0	0.28947368
24	24	124	21	39	57.5	0.53846154
25	25	128	24	39	74.0	0.61538462
26	26	134	14	39	72.0	0.35897436
27	27	112	25	41	62.5	0.60975610
28	28	128	32	41	68.0	0.78048780
29	29	134	5	41	63.4	0.12195122
30	30	128	12	42	68.0	0.28571429
31	31	140	25	43	69.0	0.58139535
32	32	138	26	43	73.0	0.60465116
33	33	118	10	43	64.0	0.23255814
34	34	110	19	44	65.0	0.43181818
35	35	142	18	44	71.0	0.40909091
36	36	134	10	45	60.2	0.22222222
37	37	116	1	47	55.0	0.02127660
38	38	132	43	50	70.0	0.86000000
39	39	152	40	54	87.0	0.74074074

```
> par(mfrow=c(2,1))
> plot(peru$FRAC, peru$SYSTOL)
> plot(peru$WEIGHT, peru$SYSTOL)
>
```



```
> fit1 <- lm(SYSTOL ~ FRAC + WEIGHT, data=peru)
> summary(fit1) # show results
```

Call:

```
lm(formula = SYSTOL ~ FRAC + WEIGHT, data = peru)
```

Residuals:

Min	1Q	Median	3Q	Max
-18.4330	-7.3070	0.8963	5.7275	23.9819

Coefficients:

	Estimate	Std. Error	t value	Pr(> t)	
(Intercept)	60.8959	14.2809	4.264	0.000138	***
FRAC	-26.7672	7.2178	-3.708	0.000699	***
WEIGHT	1.2169	0.2337	5.207	7.97e-06	***

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 9.777 on 36 degrees of freedom
Multiple R-squared: 0.4731, Adjusted R-squared:
0.4438

F-statistic: 16.16 on 2 and 36 DF, p-value: 9.795e-06

```
> anova(fit1)
```

Analysis of Variance Table

Response: SYSTOL

	Df	Sum Sq	Mean Sq	F value	Pr(>F)	
FRAC	1	498.1	498.06	5.2102	0.02846	*
WEIGHT	1	2592.0	2592.01	27.1149	7.966e-06	***
Residuals	36	3441.4	95.59			

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

```
> fit2 <- lm(SYSTOL ~ FRAC*WEIGHT, data=peru)
> summary(fit2) # show results
```

Call:

```
lm(formula = SYSTOL ~ FRAC * WEIGHT, data = peru)
```

Residuals:

Min	1Q	Median	3Q	Max
-18.6026	-7.5603	0.7291	5.6813	22.8770

Coefficients:

	Estimate	Std. Error	t value	Pr(> t)
(Intercept)	52.2224	34.1710	1.528	0.1354
FRAC	-9.8618	60.7797	-0.162	0.8720
WEIGHT	1.3560	0.5501	2.465	0.0187 *
FRAC:WEIGHT	-0.2672	0.9536	-0.280	0.7810

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.'
0.1 ' ' 1

Residual standard error: 9.905 on 35 degrees of freedom
Multiple R-squared: 0.4743, Adjusted R-squared:
0.4292

F-statistic: 10.53 on 3 and 35 DF, p-value: 4.433e-05

```
> anova(fit2)
```

Analysis of Variance Table

Response: SYSTOL

	Df	Sum Sq	Mean Sq	F value	Pr(>F)
FRAC	1	498.1	498.06	5.0769	0.03062 *
WEIGHT	1	2592.0	2592.01	26.4209	1.05e-05 ***
FRAC:WEIGHT	1	7.7	7.70	0.0785	0.78099
Residuals	35	3433.7	98.10		

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.'
0.1 ' ' 1

```
>
```