

Multiple regressions and interactions

April 3, 2018

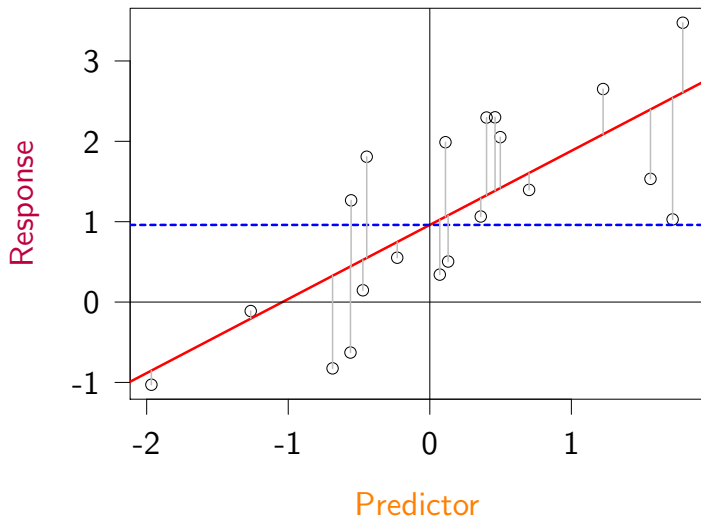
1 Linear model, reminder

2 Multiple regression

3 Interaction

A simple linear model

$$\text{Response} = \text{Intercept} + \text{Slope} \times \text{Predictor} + \text{Error}$$



A simple linear model

$$\text{Response} = \text{Intercept} + \text{Slope1} \times \text{Predictor1} + \text{Slope2} \times \text{Predictor2} + \text{Error}$$

In R:

```
lm(response ~ 1 + predictor1 + predictor2, data=data)
```

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Vocabulary warning!

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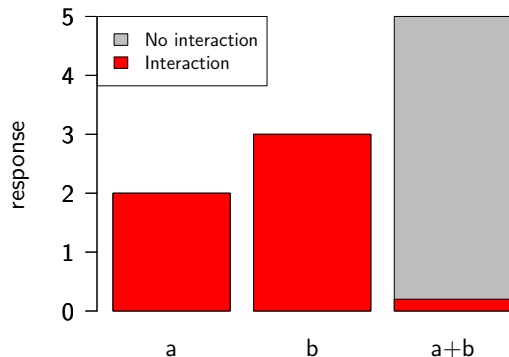
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Fitting an interaction

```
lm(y ~ 1 + a * b)
```

```
lm(y ~ 1 + a + b + a:b)
```

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```
lm(y ~ 1 + a * b)
lm(y ~ 1 + a + b + a:b)
```

```
summary(lm(y~ 1 + a*b))
```

Call:

```
lm(formula = y ~ 1 + a * b)
```

Residuals:

Min	1Q	Median	3Q	Max
-1.8719	-0.6777	-0.1086	0.5897	2.3166

Coefficients:

	Estimate	Std. Error	t value	Pr(> t)	
(Intercept)	1.14098	0.09578	11.913	< 2e-16	***
a	-0.39281	0.10834	-3.626	0.000463	***
b	0.53434	0.09881	5.408	4.67e-07	***
a:b	0.35911	0.11449	3.137	0.002270	**

Warnings

Modeling warning!

- ~~DO NOT COMPARE P-VALUES OF TWO MODELS TO TEST FOR AN INTERACTION~~