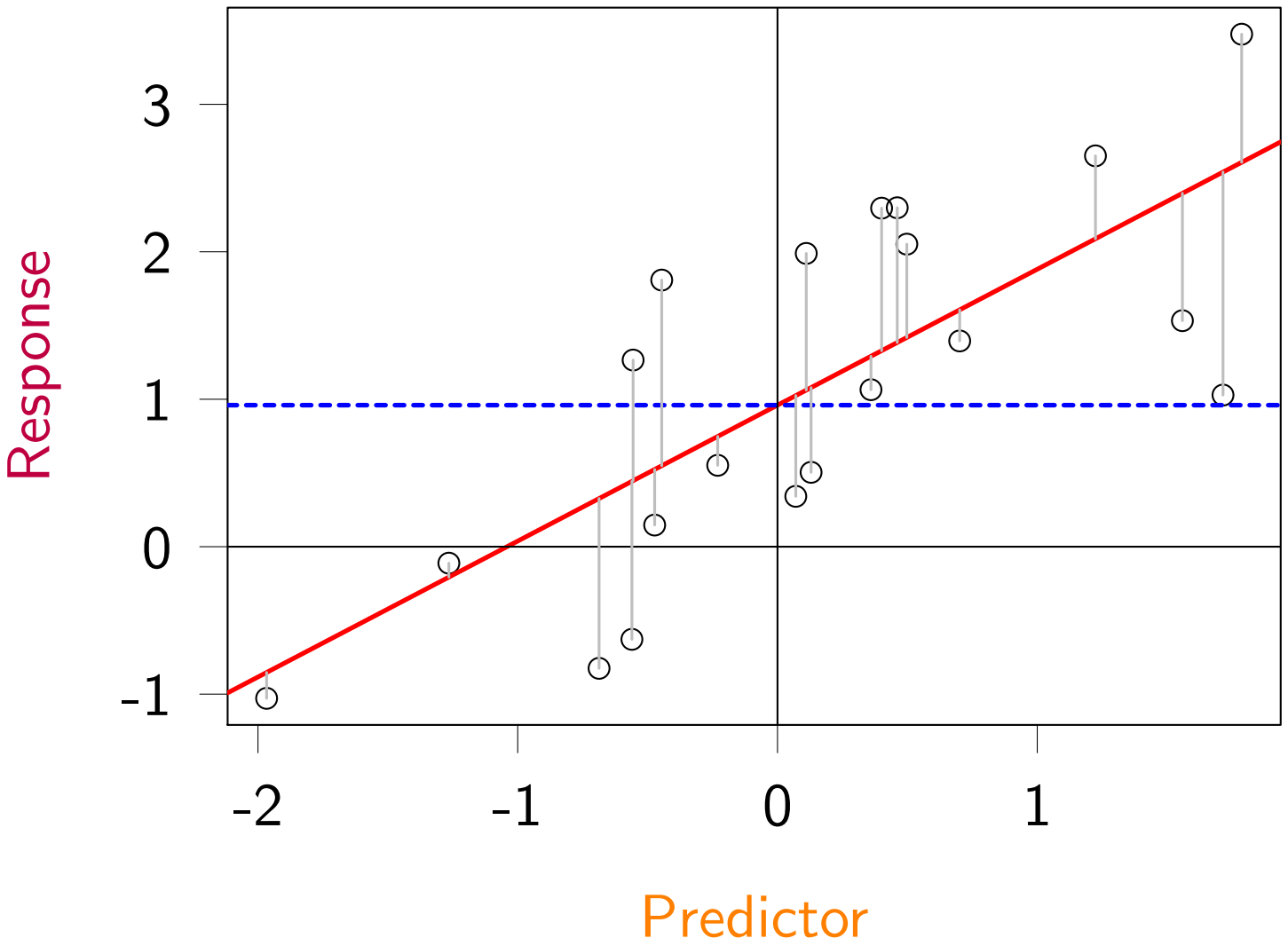
Multiple regressions and interactions

April 3, 2018

A simple linear model

Response = **Intercept** + **Slope** × **Predictor** + **Error**



A simple linear model

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

In R:

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

Warnings

Vocabulary warning!

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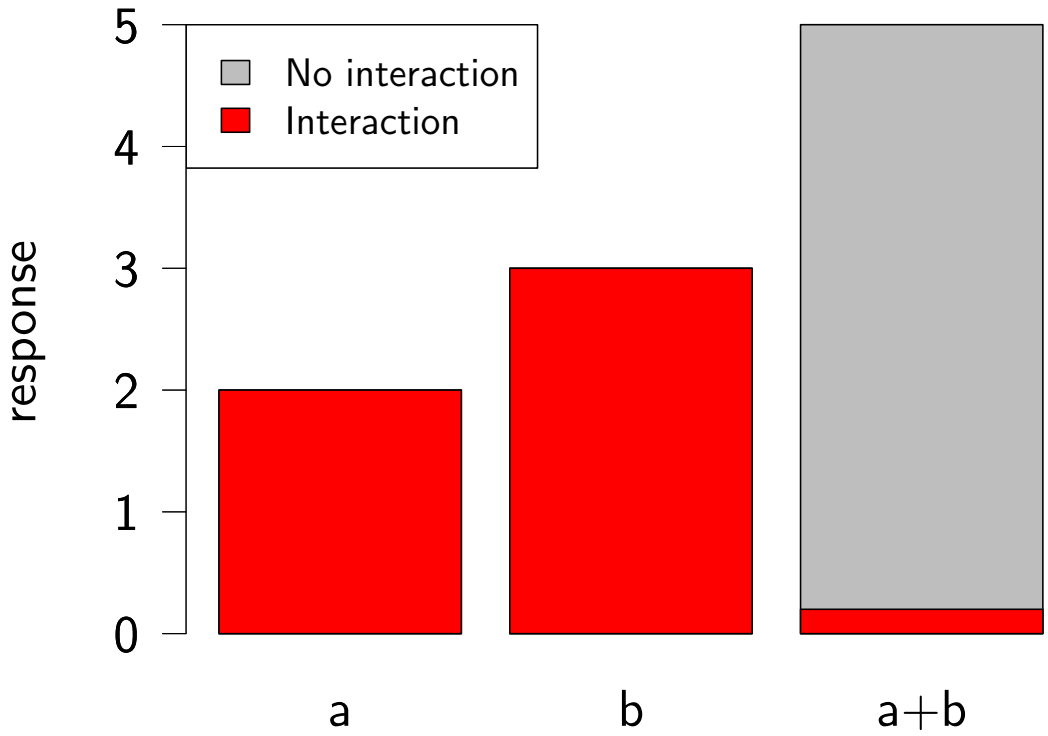

Fitting an interaction

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

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```

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

```
Error in model.frame.default(formula = y ~ 1 + a * b, drop.unused.levels
= TRUE): variable lengths differ (found for 'a')
```

Warnings

Modeling warning!

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

Exercise

1. Load the data masssex.csv
2. Fit a simple regression explaining movement by mass for each sex separately. Is the relationship different between sexes?
3. Fit the multiple regression explaining movement by mass, sex, and mass:sex, using the full dataset. Is the relationship different between sexes?
4. Try to understand the discreapancy by plotting the data

Warnings

1.

```
masssex <- read.csv(file="masssex.csv")
```

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```
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```

2.

```
summary(lm(movement ~ mass, data=masssex[masssex$sex==0,]))
summary(lm(movement ~ mass, data=masssex[masssex$sex==1,]))
```

Warnings

1.

```
masssex <- read.csv(file="masssex.csv")
```

2.

```
summary(lm(movement ~ mass, data=masssex[masssex$sex==0,]))
summary(lm(movement ~ mass, data=masssex[masssex$sex==1,]))
```

3.

```
summary(lm(movement ~ mass*sex, data=masssex))
```

Warnings