

# FALL21 PUB490 HW3

Aaron Tsui

## Part a

```
load("C:/Users/aaron/Downloads/Homework 3-20211123/BRFSS.Rdata")

brfss.rows = 1:nrow(BRFSS)
set.seed(2017)
brfss.rows.interact = sample(brfss.rows, size = 300, replace=FALSE)
brfss = BRFSS[brfss.rows.interact,]
```

## Part B

```
lm(wtdesired ~ weight, data = brfss)

##
## Call:
## lm(formula = wtdesired ~ weight, data = brfss)
##
## Coefficients:
## (Intercept)      weight
##    42.9545      0.6633
```

Actual weight is a decent predictor of desired weight. For every 1 additional pound of actual weight, desired weight increases by 0.6633.

## Part c

```
lm(wtdesired ~ weight + sex.factor, data = brfss)

##
## Call:
## lm(formula = wtdesired ~ weight + sex.factor, data = brfss)
##
## Coefficients:
##      (Intercept)      weight  sex.factorFemale
##      84.7314      0.5005      -24.9258
```

This model is more preferable than the previous model because in this model sex seems to be a better predictor of desired weight than actual weight. If the data point is Female, desired weight goes down by 24.9258, whereas weight affects desired weight less than in the previous model.

## Part d

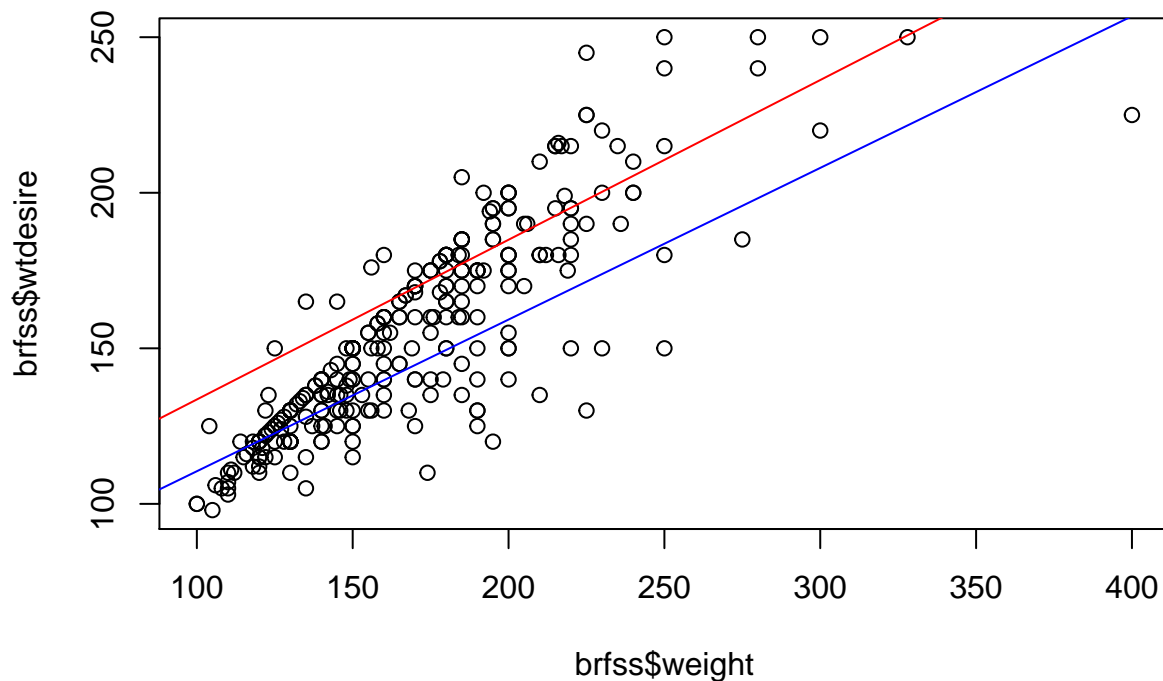
i

```

males = subset(brfss, sex.factor == "Male")
females = subset(brfss, sex.factor == "Female")

plot(brfss$wtdesired ~ brfss$weight)
abline(lm(males$wtdesired ~ males$weight), col = "red")
abline(lm(females$wtdesired ~ females$weight), col = "blue")

```



ii

```

lm(weight ~ weight + sex.factor , data = brfss)

## Warning in model.matrix.default(mt, mf, contrasts): the response appeared on the
## right-hand side and was dropped

## Warning in model.matrix.default(mt, mf, contrasts): problem with term 1 in
## model.matrix: no columns are assigned

##
## Call:
## lm(formula = weight ~ weight + sex.factor, data = brfss)
##
## Coefficients:
##      (Intercept)  sex.factorFemale
##           194.45           -45.29

Weight = 194.45 -45.29*(sex.factorFemale)

```

### iii

Male weight =  $194.45 - 45.29 \cdot (0)$

Female weight =  $194.45 - 45.29 \cdot (1)$

### iv

Yes, there is statistically significant evidence of an interaction between weight and sex. In this model, Females are typically 45.29 pounds lighter than males. Our graph in part i even shows that the general weight of males in that model are higher than the general weight of females.