

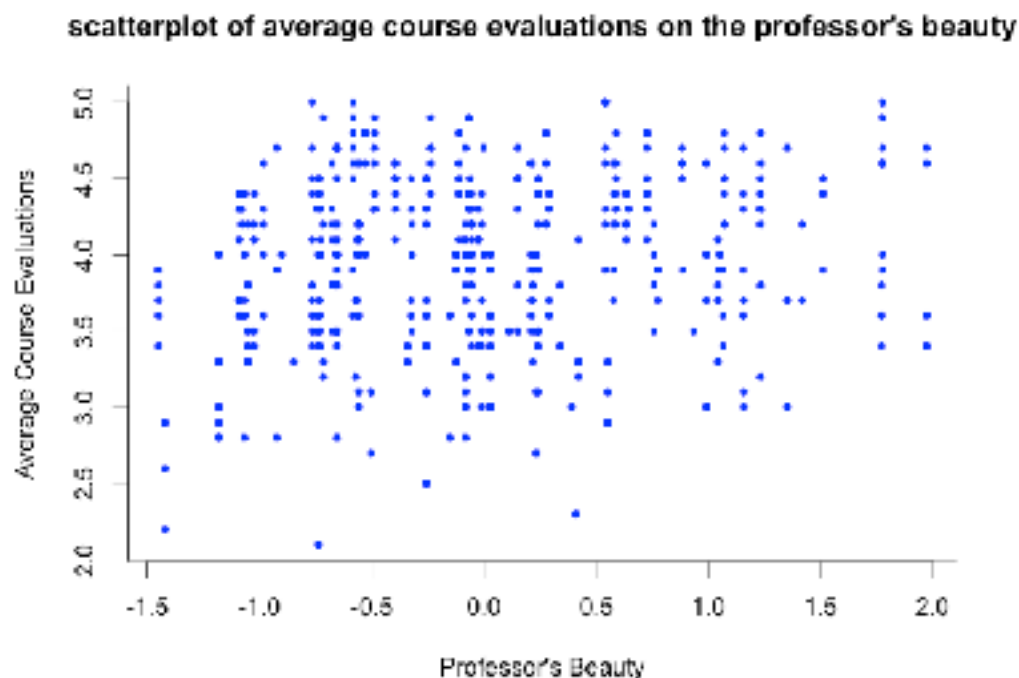
Answer of Homework 2 — E 4.2

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a.



Code:

```
setwd("/Users/xyt/Desktop/TeachingRatings")
getwd()
library(foreign)
TeachingRatings <- read.dta("TeachingRatings.dta")
head(TeachingRatings)
CB <- TeachingRatings[c("beauty", "course_eval")]
head(CB)
##### a. #####
plot(CB$beauty, CB$course_eval, col = "blue", pch = 16, cex = 0.7, bty = "l",
     main = "scatterplot of average course evaluations on the professor's
     beauty",
     xlab = "Professor's Beauty", ylab = "Average Course Evaluations")
```

b.

Call:

```
lm(formula = course_eval ~ beauty, data = CB)
```

Residuals:

Min	1Q	Median	3Q	Max

-1.80015 -0.36304 0.07254 0.40207 1.10373

Coefficients:

	Estimate	Std. Error	t value	Pr(> t)
(Intercept)	3.99827	0.02535	157.727	< 2e-16 ***
beauty	0.13300	0.03218	4.133	4.25e-05 ***

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

Residual standard error: 0.5455 on 461 degrees of freedom

Multiple R-squared: 0.03574, Adjusted R-squared: 0.03364

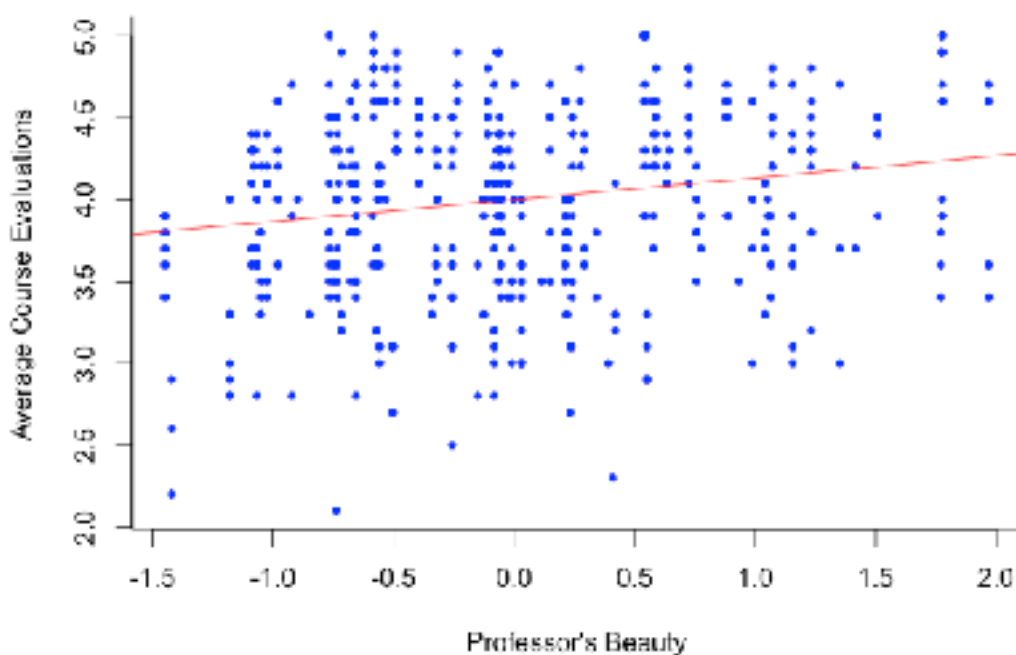
F-statistic: 17.08 on 1 and 461 DF, p-value: 4.247e-05

Intercept=3.998272

slope=0.1330014

Course Evaluation=3.99727+0.133*Beauty

scatterplot of average course evaluations on the professor's beauty



mean of course evaluation = 3.998272

mean of beauty = 4.754221e-08

Because the slope is too small, the Beauty has less effect on course_eval.
So the estimated intercept is equal to the sample mean of course_eval.

Code

```
##### b. #####  
mod1 <- lm(course_eval ~ beauty, data = CB)  
summary(mod1)  
intercept <- coef(mod1)[1]  
slope <- coef(mod1)[2]abline(intercept, slope, col="red")  
  
meaneval <- mean(TeachingRatings$course_eval)  
meanbeauty <- mean(TeachingRatings$beauty)
```

c.

```
mean of beauty = 4.754221e-08  
sd(CB$beauty) = 0.7886477  
Professor Waston's Beauty = 4.754221e-08  
Professor Stock's Beauty = 0.03218005  
So,  
Professor Waston's course evaluation = 3.99727  
Professor Stock's course evaluation = 4.00155
```

d.

```
the standard evaluation of beauty = 0.7886477  
the standard evaluation of course_eval = 0.5548656  
A one standard deviation increase in beauty causes increased in course  
evaluation by  $0.133 * 0.7886477 = 0.1048901$   
The estimated effect of beauty on course evaluation is small, because one  
unit change in Beauty causes little change in course evaluation.
```

e.

R^2 is usually the first statistics that we look at for judging how well the regression model fits the data.
Multiple R-squared = 0.03574, which implies that the regressor STR explains only 3.6% of the variance of the dependent variable Course_Eval.