Interpreting the Linear Model

0:00 / 8:16

1.0x

comes about, we need to take a breather

- we need to take a step back.

Let's look at the linear model more closely

and see what each of these parameters are actually tell us.

Because, if we're not careful, our good fitting model

may give us some very bad results.

We recently found a model that fits the relationship

between socioeconomic status and bicycle helmet

Download transcript .srt

Comprehension Check

1. Here's our millionaire data again:

Do states with higher populations have more millionaires? Here is data from 2008. The variable, "Population," in the table and scatterplot will be referred to as State.Population in the questions that follow so as to avoid confusion with the meaning of "population" as a statistical concept.

State	Millionaires *(in thousands)*	Population *(in hundreds of thousands)*

Lecture Videos
Comprehension Check due Mar 15, 2016 at 18:00 UTC

R Tutorial Videos

Pre-Lab
Pre-Lab due Mar 15, 2016 at 18:00 UTC

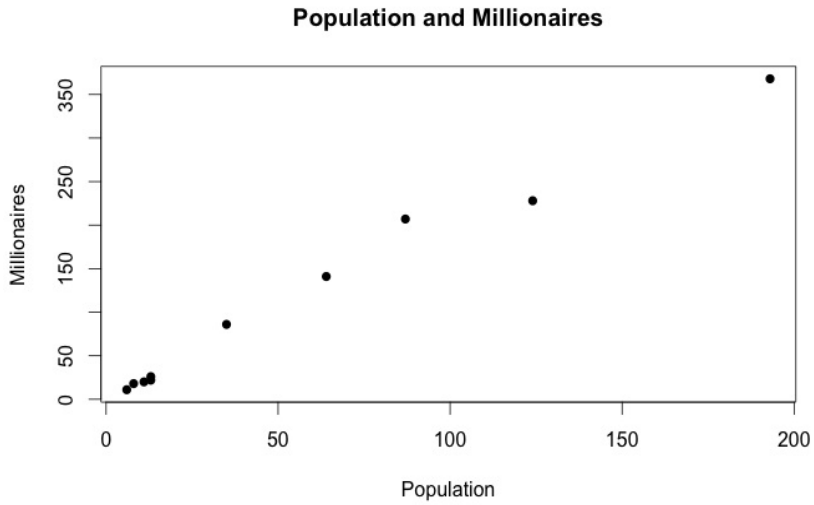
Lab
Lab due Mar 15, 2016 at 18:00 UTC

Problem Set
Problem Set due Mar 15, 2016 at 18:00 UTC

Connecticut	86	35
Delaware	18	8
Maine	22	13
Massachusetts	141	64
New Hampshire	26	13
New Jersey	207	87
New York	368	193
Pennsylvania	228	124
Rhode Island	20	11
Vermont	11	6

Using linFit(), the following linear model is found:

Millionaires = 6.296 + (1.921 * State.Population)



(2/2 points)
1a. What is the interpretation of ŷ for this model, if y represents the variable, Millionaires?

- It is the amount of variability in the number of millionaires that can be explained by state population.
- It is the average number of millionaires for the entire sample.

- (●) It is predicted number of millionaires, based on a population in a state. ✔
- ( ) It is the slope of the line.

1b. This linear model crosses the y-axis at **6.296**. What is the interpretation of this point?

- (●) A state with a population of 0 is expected to have 6,296 millionaires. ✔
- ( ) The average income of a millionaire in the US is $6.2 million.
- ( ) A state with 6.2 thousand people will have one millionaire.
- ( ) States earn $6.2 more for every millionaire that resides in them. A state with 6.2 thousand people will have one millionaire.

1c. You create a new variable, subtracting the lowest Population value in the sample from each Population value: **new_pop <- State.Population – min(State.Population).**

This gives a new result from linFit():

Millionaires=17.82 + (1.921 * State.Population)

(2/2 points)
1d. What is the interpretation of **17.82** in this model?

- (●) On average, a state with a population equal to the lowest population has 17,820 millionaires. ✔
- ( ) The average income of a millionaire in the US is $17.82 million.
- ( ) The intercept is not meaningful.

- A state with 17.82 thousand people will have 1.9 millionaires.

1e. Interpret **1.921** in the above model (with an intercept of 17.82).

- As the population of a state increases by one whole person, it will gain 1.921 millionaires.
- As the population of a state increases by 100,000, they will gain 1,921 millionaires. ✔
- States can earn $1.921 for every millionaire that resides within them.
- A state with zero millionaires will have a population of 1,921,000.