STAT 270 Lecture 4
Spring 2015
16 September 2015

- We covered slides 85-95 of "Descriptive Statistics".
- I still want you to read all of Chapter 2 and the first 3 sections of Chapter 3 for Friday.
- We have now covered up to Chapter 2 section 5.1 and part of 5.2.
- Next class I will do Chapter 2 sections 3.2 to the end of the chapter.
- You should continue to review (and do as many as possible of) Chapter 2 questions.
- Handwritten slides.
- Key jargon, ideas:
  - Defined Pearson for lists of pairs (x_1, y_1), (x_2, y_2), and so on up to (x_n, y_n):
$$r = \frac{1}{n-1} \sum \left(\frac{x_i - \bar{x}}{s_x} \right) \left(\frac{y_i - \bar{y}}{s_y} \right)$$
  - I called
$$\left(\frac{x_i - \bar{x}}{s_x} \right)$$
a *standard score* for x_i.
  - r is unitless.
  - Summarizes linear relation between x and y.
  - $-1 \leq r \leq 1$. Equals 1 for perfect line of positive slope. Equals -1 for perfect line of negative slope.
  - Derived several alternative formulas for r.
  - Based on
$$\begin{aligned} \sum (x_i - \bar{x})(y_i - \bar{y}) &= \sum \{x_y y_i - x_i \bar{y} - y_i \bar{x} + \bar{x}\bar{y}\} \\ &= \sum x_i y_i - n\bar{x}\bar{y}. \end{aligned}$$
  - So by putting $y = x$:
$$\sum (x_i - \bar{x})^2 = \sum x_i^2 - n\bar{x}^2.$$