Regression and Correlation

READING:	2.3
EXERCISES:	CH 2. 21-22
ASSIGNED:	HW 6
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Correlation

- Denoted Using *r*
- Measures Strength of **Linear Association** Between 2 Quantitative Variables
- Always Between -1 and +1
- If *r=0*, then There Is No Linear Relationship Between the Variables

t-Test for Correlation

- Step 1: Significance Level
- Step 2: Hypotheses
  - H_0: $\rho = 0$
  - H_a: $\rho \neq 0$
- Step 3: Get Data and Get *r* From Your Sample
- Step 4: Test Statistic

$$t^* = \frac{r\sqrt{n-2}}{\sqrt{1-r^2}}$$

t-Test for Correlation

- Step 5: P-value
  - Use t-Distribution with $n - 2$ Degrees of Freedom
  - Two-Sided or Non-Directional
  - Method Identical to the t-Test for the Slope
- Step 6: Decision
- Step 7: Interpret Results to Audience

Correlation and Slope

- Equivalent Tests in **Simple Linear Regression**
  - t-Test for Slope
  - ANOVA F-Test for Regression
  - t-Test for Correlation

- Formula for Slope in Simple Linear Regression

$$\hat{\beta}_1 = r\frac{s_y}{s_x}$$

Coefficient of Determination

- Denoted Using r^2 or R^2 or $R - Squared$
- Formula: $$r^2 = \frac{SSModel}{SSTotal} = \frac{SSTotal - SSE}{SSTotal} = 1 - \frac{SSE}{SSTotal}$$
- Measures the Proportion of Total Variation in *Y* that is Explained by *X* in the Simple Linear Regression Model (Percentage: Multiply by 100)
- Interpret in the Context of the Data

Thank You

Make Reasonable Decisions