V31 - Hypothesis Testing – Part 7

- Use of Z distribution for inference on difference in two population proportions

Course: Statistical Testing & Regression
Dr. Renee Clark
Swanson School of Engineering
Industrial Engineering
University of Pittsburgh

Inference for Difference in Two Proportions ($p_1 - p_2$)

Example: explore sedans vs. full sized trucks on reliability

p_1 is proportion of all sedans that break down before accruing 50K miles

p_2 is proportion of all full-sized trucks that break down before accruing 50K miles

?? Do these population proportions differ?

Inference for Difference in Two Proportions ($p_1 - p_2$)

CI:

$$(\hat{p}_1 - \hat{p}_2) \pm z_{\alpha/2} \sqrt{\frac{\hat{p}_1(1-\hat{p}_1)}{n_1} + \frac{\hat{p}_2(1-\hat{p}_2)}{n_2}}$$

H_o: $p_1 = p_2$

Define $\hat{p}$ *as pooled estimate of* p:

$$p \approx \hat{p} = \frac{Y_1 + Y_2}{n_1 + n_2},$$

$$Z = \frac{(\hat{p}_1 - \hat{p}_2)}{\sqrt{\hat{p}(1-\hat{p})\left(\frac{1}{n_1} + \frac{1}{n_2}\right)}}$$

Inference for Difference in Two Proportions ($p_1 - p_2$)

Key Assumptions:

Inference for Difference in Two Proportions ($p_1 - p_2$)

Relationship to Confidence Interval

$H_o: p_1 = p_2$

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