Ch 10

Comparing 2 populations

Check Conditions

R

N

Independence - within group <u>and</u> between groups.

	S.D. $\hat{p}_1$	S.D. of $\hat{p}_2$
Shape	$np \geq 10$, $n(1-p) \geq 10 \rightarrow$ Approx. Normal	
Center	$\mu_{\hat{p}_1} = p_1$	$\mu_{\hat{p}_2} = p_2$
Spread	$\sigma_{\hat{p}_1} = \sqrt{\dfrac{p_1(1-p_1)}{n}}$	$\sigma_{\hat{p}_2} = \sqrt{\dfrac{p_2(1-p_2)}{n}}$

Sampling Distribution of $\hat{p}_1 - \hat{p}_2$

$\rightarrow$ if conditions are met:

Shape: Approx. normal if

$n_1 p_1 \geq 10$, $n_1(1-p_1) \geq 10$,

$n_2 p_2 \geq 10$, & $n_2(1-p_2) \geq 10$

Center: $p_1 - p_2$

Spread:

$$\sqrt{\frac{p_1(1-p_1)}{n_1}+\frac{p_2(1-p_2)}{n_2}}$$

P. 608 CYU

25% red

Bag 1

pop. ≥ 500 crackers

35% red

Bag 2

pop. ≥ 500 crackers

$n_1 = 50$

$p_1 = 0.25$

$n_2 = 40$

1. $n_1 p_1 = 50(.25) = 12.5 \geq 10$

$n_1(1-p_1) = 50(.75) = 37.5 \geq 10$

$n_2 p_2 = 40(.35) = 14 \geq 10$

$n_2(1-p_2) = 40(.65) = 26 \geq 10$

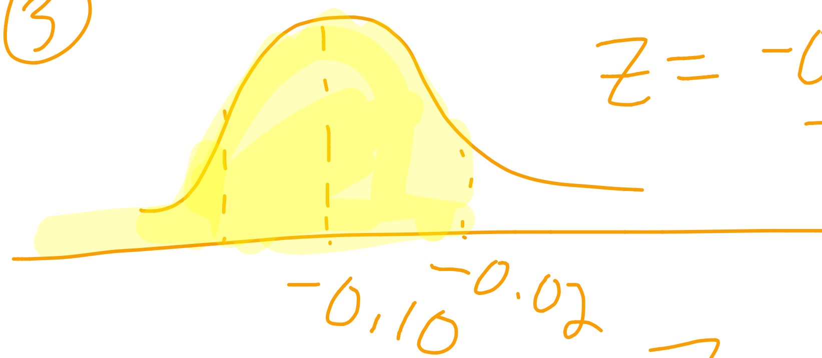
All of the above are at least ten, therefore the sampling distribution of $\hat{p}_1 - \hat{p}_2$ is approximately normal.

2 $\mu_{\hat{p}_1-\hat{p}_2} = 0.25 - 0.35 = -0.10$

$$\sigma_{\hat{p}_1-\hat{p}_2} = \sqrt{\frac{(0.25)(.75)}{50} + \frac{(.35)(.65)}{40}}$$

$\sigma_{\hat{p}_1-\hat{p}_2} = 0.0971$

(3)



$$z = \frac{-0.02 - -0.1}{0.0971}$$

$$z = 0.82$$

area to left is 0.7939. The probability that $\hat{p}_1 - \hat{p}_2$ is less than -0.02 is 0.7939.

RG — 1-15 odd