

AP Statistics
Chapter 10:
Comparing Two Populations
Day 2
HW: Lesson 2 Practice Worksheet

1910 randomly selected U.S. adults on August 28-30, 2009, showed that 53% approved of Obama's job performance. Use the results from these polls to construct and interpret a 90% confidence interval for the change in Obama's approval rating among all U.S. adults.

Conditions

- As stated, this is an SRS.
- We can assume there are at least 10,240 adults in 2010 and 10,100 adults in 2009.

③ 2010 2009

$1024(.50) \geq 10$	$1010(.53) \geq 10$
$1024(.50) \geq 10$	$1010(.47) \geq 10$

There are at least 10 successes and failures

P_1 = Proportion of adults who approved in 2010
 P_2 = Proportion of adults who approved in 2009

$P_1 - P_2$ CI = (-.0652, .00774)

P_1	P_2
$\hat{p}_1 = .50$	$\hat{p}_2 = .53$
$x_1 = 512$	$x_2 = 536$
$n_1 = 1024$	$n_2 = 1010$

We are 90% confident that the true difference in the proportion of adults who approved of Obama's job performance from 2009-2010 is between -6.52% and .774%. This suggests that his approval rate has decreased from 2009-2010.

Project asked a random sample of 800 teens and a separate random sample of 2252 adults how often they use the Internet. In these two surveys, 63% of teens and 68% of adults said that they go online every day. Construct and interpret a 90% confidence interval for $p_1 - p_2$.

* Don't forget conditions.

P_1 = Proportion of teens who go online every day.
 P_2 = Proportion of adults who go online every day

$P_1 - P_2$ CI = (-.0324, -.0176)

P_1	P_2
$\hat{p}_1 = .63$	$\hat{p}_2 = .68$
$x_1 = 504$	$x_2 = 1532$
$n_1 = 800$	$n_2 = 2252$

We are 90% confident that the true difference in the proportion of teens and adults that go online every day is between -3.24% and -1.76%. This suggests that more adults go online every day than teens.

Significance Tests for Two-Samples

Researchers designed a survey to compare the proportions of children who come to school without eating breakfast in two low-income elementary schools. An SRS of 80 students from School 1 found that 19 had not eaten breakfast. At School 2, an SRS of 150 students included 26 who had not had breakfast. More than 1500 students attend each school. Do these data give convincing evidence of a difference in the population proportions? Carry out a significance test at the $\alpha = 0.05$ level to support your answer.

$H_0: P_1 = P_2$ $\hat{P}_1 = .2375$ $\hat{P}_2 = .1733$ P_1 = The proportion of students who did not eat breakfast in School 1.

$H_a: P_1 \neq P_2$ $x_1 = 19$ $x_2 = 26$ P_2 = " " in school 2

$n_1 = 80$ $n_2 = 150$

Example Continued

$$Z = 1.168 \quad P\text{-value} = .2427$$

Using my calculator, I performed a Z-proportion Z-test. Since the p-value is .2427 and is greater than the significance level of $\alpha = .05$, we fail to reject H_0 . There is not sufficient evidence to conclude that there is a difference between the proportion of students in school 1 and 2 who do not eat breakfast.

Are Teenagers Going Deaf?

In a study of 3000 randomly selected teenagers in 1988-1994, 15% showed some hearing loss. In a similar study of 1800 teenagers in 2005-2006, 19.5% showed some hearing loss. Do these data give convincing evidence that the proportion of all teens with hearing loss has increased?

$$P_1 = 1988-1994$$

$$P_2 = 2005-2006$$

$$H_0: P_1 = P_2$$

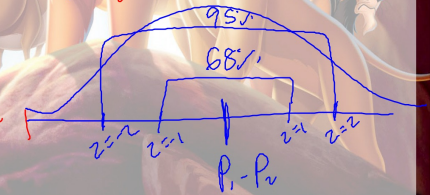
$$H_a: P_1 < P_2$$

$$3000(.15) = 450$$

$$1800(.195) = 351$$

$$P = .0000258$$

$$Z = -4.047$$



Are Teenagers Going Deaf?

