Stat Support Activity: Two-Population Proportion Z-test statistic Calculations (Updated Version)

1.

We want to compare the population percentage of people that identify as men and have at least one tattoo (π_1) and the population percentage of people that identify as women and have at least one tattoo (π_2). A random sample of 857 people that identify as men found that 146 of them had at least one tattoo. A random sample of 794 people that identify as women found that 137 of them had at least one tattoo. Calculate the Z-test statistic to compare the sample proportions.

a) Calculate sample proportion 1 ($\hat{p}_1$) for men with a tattoo.

$$\hat{p}_1 = \frac{x_1}{n_1} = \frac{amount\ in\ sample\ 1}{total\ sample\ 1}$$

b) Calculate sample proportion 2 ($\hat{p}_2$) for women with a tattoo.

$$\hat{p}_2 = \frac{x_2}{n_2} = \frac{amount\ in\ sample\ 2}{total\ sample\ 2}$$

c) Calculate the sample proportion difference $\hat{p}_1 - \hat{p}_2$ by subtracting the answers in part (a) and part (b).

d) Calculate p-pooled ($\bar{p}$) = $\frac{(x_1+x_2)}{(n_1+n_2)}$ =

e) Calculate the complement of p-pooled $(1 - \bar{p})$ by subtracting your answer in letter (d) from 1.

f) The standard error has been calculated for you using p-pooled, 1 minus p-pooled, and the formula.

Standard Error = $\sqrt{\left(\frac{\bar{p}(1-\bar{p})}{n_1} + \frac{\bar{p}(1-\bar{p})}{n_2}\right)}$ = 0.01856

g) Calculate the two-population Z-test statistic by dividing the answers to part (c) and part (f).

Z – test statistic = $\frac{sample\ proportion\ difference}{standard\ error}$ = $\frac{(\hat{p}_1-\hat{p}_2)}{standard\ error}$ =

h) Z – test statistic sentence: The sample proportion for men with at least one tattoo was _____ standard errors *(above or below)* the sample proportion for women with at least one tattoo. *(Note: Use "above" if Z – test stat is positive. Use "below" if Z – test stat is negative.)*

Stat Support Activity: Two-Population Proportion Z-test statistic Calculations (Updated Version)

2.

A random sample of 135 women that smoke (population 1) found that 38 were able to get pregnant in the allotted amount of time. A random sample of 543 women that do not smoke (population 2) found that 206 were able to get pregnant in the allotted amount of time.

a) Calculate sample proportion 1 $(\hat{p}_1)$ of smoking women that were able to get pregnant.

$$\hat{p}_1 = \frac{x_1}{n_1} = \frac{amount\ in\ sample\ 1}{total\ sample\ 1}$$

b) Calculate sample proportion 2 $(\hat{p}_2)$ of non-smoking women that were able to get pregnant.

$$\hat{p}_2 = \frac{x_2}{n_2} = \frac{amount\ in\ sample\ 2}{total\ sample\ 2}$$

c) Calculate the sample proportion difference $\hat{p}_1 - \hat{p}_2$ by subtracting the answers in part (a) and part (b).

d) Calculate p-pooled $(\bar{p})$ = $\frac{(x_1+x_2)}{(n_1+n_2)}$ =

e) Calculate the complement of p-pooled $(1 - \bar{p})$ by subtracting your answer in letter (d) from 1.

f) The standard error has been calculated for you using p-pooled, 1 minus p-pooled, and the formula.

Standard Error = $\sqrt{\left(\frac{\bar{p}(1-\bar{p})}{n_1} + \frac{\bar{p}(1-\bar{p})}{n_2}\right)}$ = 0.04616

g) Calculate the two-population Z-test statistic by dividing the answers to part (c) and part (f).

Z – test statistic = $\frac{sample\ proportion\ difference}{standard\ error}$ = $\frac{(\hat{p}_1-\hat{p}_2)}{standard\ error}$ =

h) Z – test statistic sentence: The sample proportion of smoking women that were able to get pregnant was _____ standard errors *(above or below)* the sample proportion of non-smoking women that were able to get pregnant. *(Note: Use "above" if Z – test stat is positive. Use "below" if Z – test stat is negative.)*

Stat Support Activity: Two-Population Proportion Z-test statistic Calculations (Updated Version)

3. Sample 1: People that do NOT use Marijuana but do use other drugs.
   Sample 2: People that use Marijuana and other drugs.

	Use Other Drugs	Total
Sample 1 (Do not use Marijuana)	26	219
Sample 2 (Use Marijuana)	87	213

a) Calculate sample proportion 1 $(\hat{p}_1)$ of non-marijuana users that use other drugs.

$$\hat{p}_1 = \frac{x_1}{n_1} = \frac{amount\ in\ sample\ 1}{total\ sample\ 1}$$

b) Calculate sample proportion 2 $(\hat{p}_2)$ of marijuana users that use other drugs.

$$\hat{p}_2 = \frac{x_2}{n_2} = \frac{amount\ in\ sample\ 2}{total\ sample\ 2}$$

c) Calculate the sample proportion difference $\hat{p}_1 - \hat{p}_2$ by subtracting the answers in part (a) and part (b).

d) Calculate p-pooled $(\bar{p})$ = $\frac{(x_1+x_2)}{(n_1+n_2)}$

e) Calculate the complement of p-pooled $(1 - \bar{p})$ by subtracting your answer in letter (d) from 1.

f) The standard error has been calculated for you using p-pooled, 1 minus p-pooled, and the formula.

Standard Error = $\sqrt{\left(\frac{\bar{p}(1-\bar{p})}{n_1} + \frac{\bar{p}(1-\bar{p})}{n_2}\right)}$ = 0.0423

g) Calculate the two-population Z-test statistic by dividing the answers to part (c) and part (f).

Z – test statistic = $\frac{sample\ proportion\ difference}{standard\ error}$ = $\frac{(\hat{p}_1-\hat{p}_2)}{standard\ error}$ =

h) Z – test statistic sentence: The sample proportion of non-marijuana users that use other drugs was _____ standard errors *(above or below)* the sample proportion of marijuana users that use other drugs. *(Note: Use "above" if Z – test stat is positive. Use "below" if Z – test stat is negative.)*