Two-Population Confidence Intervals Formulas & Assumptions

Two Pop. Mean Ave Matched Pair or Seperate Groups

1. Random Samples
2. Individuals Independent
3. Sample Size (s) $n \geq 30$ or normal.

Two Pop. Proportion Assumptions

1. Random Samples
2. Individuals Independent
3. Both Samples have at least 10 Successes
4. Both Samples have at least 10 failures.

Two-Pop mean Conf Int (Seperate)

Ex 1: Stat Students COC

Pop 1: No tattoo # Spent Ave meals eat out. (95% Conf. Level)

Pop 2: Yes Tattoo # Spent Ave meals eat out.

$\bar{x}_1 = 11.582$ $\bar{x}_2 = 12.788$

$s_1 = 5.718$ $s_2 = 6.833$

$n_1 = 239$ $n_2 = 85$

Sample Dif ± Margin of Error (T × Standard Error)

$(df = 128, T = \pm 1.979)$

$$(\bar{x}_1 - \bar{x}_2) \pm \left(T \times \sqrt{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}}\right)$$

$$(11.582 - 12.788) \pm \left(1.979 \times \sqrt{\frac{(5.718)^2}{239} + \frac{(6.833)^2}{85}}\right)$$

$-1.206 \pm (1.979 \times 0.8283)$

-1.206 ± 1.639 marg Error

$(-2.845, +0.433)$ No sig Dif

Two pop proportion conf. int.

Ex 2: Stat Students COC

Pop 1: No tattoo Proportion

Pop 2: Yes tattoo Proportion

$x_1 = 239$ $x_2 = 85$ (90% Conf. Level)

$n_1 = 324$ $n_2 = 324$

$\hat{p}_1 = 0.738$ $\hat{p}_2 = 0.262$

Sample Dif ± Margin of Error (Z × Standard Error)

$(z = \pm 1.645)$

$$(\hat{p}_1 - \hat{p}_2) \pm \left(z \times \sqrt{\frac{\hat{p}_1(1-\hat{p}_1)}{n_1} + \frac{\hat{p}_2(1-\hat{p}_2)}{n_2}}\right)$$

$$(0.738 - 0.262) \pm \left(1.645 \times \sqrt{\frac{.738(.262)}{324} + \frac{.262(.738)}{324}}\right)$$

$0.476 \pm (1.645 \times 0.0345)$

0.476 ± 0.057 Marg Error

$(+0.419, +0.533)$ Higher

41.9% 53.3%

Two pop mean Conf. int. (matched pair) Health Data

Ex 3:

Pop 1: Diastolic Blood Pressure

Pop 2: Systolic Blood Pressure

$\bar{d} = -44.525$ (99% Conf. Level)

$s_d = 10.077$

$n = 80$

Sample Dif ± Margin of Error (T × Standard Error)

$df = 79, T = \pm 2.639$

$$\bar{d} \pm \left(T \times \frac{s_d}{\sqrt{n}}\right)$$

$$(-44.525) \pm \left(2.639 \times \frac{10.077}{\sqrt{80}}\right)$$

1.127

-44.525 ± 2.974 marg Error

$(-47.499, -41.551)$ mm of Hg