

Question 4.

Step 1: Determination of Test hypothesis.

H_0 : There is no difference between the proportion of white collar workers and blue collar workers who believe the Police are of excessive force. That is $H_0: P_1 = P_2$

H_1 : There is a difference between the proportion of white collar workers and blue collar workers who believe the Police are of excessive force. That is $H_1: P_1 \neq P_2$

Police use of excessive force. That is $H_1: P_1 \neq P_2$

Step 2: Determination of Significance level and Test method.

For this analysis, the Significance level is 0.05. The first method is a two proportion ~~two~~ population Z-test.

Step 3: Determination of Test Statistic.

Sample Proportions Population $P = \left(\frac{P_1 \times n_1}{n_1 + n_2} + \frac{P_2 \times n_2}{n_1 + n_2} \right)$

$$P_1 = \frac{325}{425} = \frac{11}{12}, n_1 = 425$$

$$P_2 = \frac{325}{615} = \frac{65}{123}, n_2 = 615$$

$$P = \left(\frac{\frac{11}{12} \times 425}{12} + \frac{\frac{65}{123} \times 615}{12} \right)$$

$$= \frac{425 + 615}{1040}$$

$$= \frac{600}{1040}$$

$$= 0.5769$$

$$\text{Standard Error (SE)} = \sqrt{\frac{P(1-P)}{n_1 + n_2}}$$

$$= \sqrt{\frac{0.5769(1-0.5769)}{425 + 615}}$$

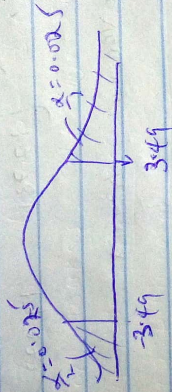
$$= 0.0312$$

$$Z_{\text{Calculated}} = \frac{(P_1 - P_2)}{SE} = \frac{\frac{11}{12} - \frac{65}{123}}{0.0312} = \underline{\underline{-3.8014}}$$

Step 4: Calculate critical value.

$$Z_{critical} = ?$$

Since it is 2-tailed, we use $\frac{\alpha}{2} = \frac{0.05}{2} = 0.025$



$$Z_{critical} = 3.49$$

Step 5: Interpretation of Results.

Since $-3.49 < 3.8014 > 3.49$, it ~~fail to~~ ^{fail to} reject the null hypothesis. ACCEPTED

Step 6: Conclusion.

Since Z_{test} is greater than $Z_{critical}$, we ~~fail to~~ ^{fail to} reject the null hypothesis and conclude that there is no difference between the proportion of white collar workers and blue collar workers who believe the police use of excessive force at 5% significance level.

Question 5.

Step 1: Data.

Positions	After (A)	Before (B)	d = A - B
A	18	15	-3
B	15	13	-2
C	14	14	0
D	16	14	-2
E	10	7	-3
F	17	14	-3
G	14	11	-3
H	15	14	-1
I	10	11	+1
J	9	8	-1
K	16	12	-4
L	13	13	0
M	9	7	-2
N	16	15	-1
O	12	14	2
			<u>-22</u>

$$n = 15$$

$$\alpha = 0.05$$

Step 2: Assumptions.

The observed differences are in a simple random sample from a normally distributed population of differences.

Step 3: Hypothesis.

$H_0: \mu_d \geq 0$ (cognitive-behavioral program has no effect on level of aggression)
 $H_1: \mu_d < 0$ (cognitive-behavioral program has effect on level of aggression)

Step 4: Test Statistic

$$t = \frac{\bar{d} - \mu_{d0}}{S_d / \sqrt{n}}$$

Step 5: Calculation of test statistics.

$$\bar{d} = \frac{\sum d_i}{n} = \frac{-22}{15} = -1.4667$$

$$S_d = \sqrt{\frac{\sum (d_i - \bar{d})^2}{n}} = \sqrt{\frac{39.7333}{15}} = 1.6275$$

$$S_{\bar{d}} = \frac{S_d}{\sqrt{n}} = \frac{1.6275}{\sqrt{15}} = 0.4202$$

$$t = \frac{\bar{d} - \mu_{d_0}}{S_{\bar{d}}} = \frac{-1.4667 - 0}{0.4202}$$

$$= -3.4905$$

Step 6: Critical Region.

$$d.f = n - 1 = 15 - 1 = 14$$

$$\alpha = 0.05$$

$$t_{(14, 0.05)} = 1.761$$



Step 7: Statistical decision.

$$\text{Reject } H_0 \text{ since } t_{calc} = -3.4905 < t_{(14, 0.05)} = 1.761$$

Step 8: Conclusion.

Since $t_{calc} < t_{critical}$, we reject null hypothesis and conclude that Congenital-behavioral program has effect on level of Aggression at 5% significance level.