

ANOVA Revisited

Recall ANOVA

Group 1 Group 2 Group 3

10	9	16
15	6	18
13	11	12
12	5	19
9	7	15

\bar{Y}_j 11.8 7.6 16 $Y_{..} = 11.8$

S_Y^2 2.387 2.408 2.739

$$H_0: \mu_1 = \mu_2 = \mu_3$$

ANOVA Table

Source	SS	df	MS	F
Between	176.4	2	88.2	13.93***
Within	76	12	6.33	
Tot	252.4	14		

$$F^* = F^*(.05, 2, 14) = 3.89$$

Therefore, reject H_0 .

Regression Analysis

Y Z1 Z2

10	1	0
15	1	0
13	1	0
12	1	0
9	1	0
9	0	1
6	0	1
11	0	1
5	0	1
7	0	1
16	0	0
18	0	0
12	0	0
19	0	0
15	0	0

$$H_0: \beta_1 = \beta_2 = 0$$

Correlation Matrix

	Y	Z1	Z2
Y	4.24	0	-0.724
Z1		0.49	-0.5
Z2			0.49
Mean	11.8	0.33	0.33

$$b_1 = \frac{r_{Y1} - r_{Y2} \cdot r_{12}}{1 - r_{12}^2} \cdot \frac{s_Y}{s_{X1}} = \frac{0 - (-.724) \cdot (-.5)}{1 - (-.5)^2} \cdot \frac{4.24}{.49} \approx -4.2$$

$$b_2 = \frac{r_{Y2} - r_{Y1} \cdot r_{12}}{1 - r_{12}^2} \cdot \frac{s_Y}{s_{X2}} = \frac{(-.724) - (0) \cdot (-.5)}{1 - (-.5)^2} \cdot \frac{4.24}{.49} \approx -8.4$$

$$b_0 = \bar{Y} - b_1 \bar{Z}_1 - b_2 \bar{Z}_2 = 11.8 - (-4.2)(.33) - (-8.4)(.33) \approx 16$$

$$Y' = 16 - 4.2Z_1 - 8.4Z_2$$

16 is the mean of Group 3, -4.2 is the difference between Group 1 and Group 3, and -8.4 is the difference between Group 2 and Group 3.

ANOVA Table

Source	SS	df	MS	F
Reg	176.4	2	88.2	13.93***
Res	76	12	6.33	
Tot	252.4	14		

$$F^* = F^*(.05, 2, 14) = 3.89$$

Therefore, reject H_0 .