

H_0 : There is no significant difference b/w scores
 H_1 : There is significant difference b/w scores

Stun-ID	Test 1	Test 2	Final	
1	59.44	71.64	75.18	68.75 77
2	67.34	69.59	80.76	
3	54.39	72.34	79.44	
4	64.75	73.69	93.17	
5	68.64	68.11	74.88	
6	62.29	65.79	76.09	
7	51.58	69.25	82.12	
	61.64	69.77	80.23	

Grand mean:

$$\bar{x}_{\text{grand}} = 70.55$$

Between - groups:

$$SS_B = n \sum (\bar{x}_j - \bar{x}_{\text{grand}})^2$$

$$n = 7$$

$$\text{Test 1} = (61.64 - 70.55)^2 \Rightarrow 79.39$$

$$\text{Test 2} = (69.77 - 70.55)^2 \Rightarrow 0.60$$

$$\text{Test 3} = (80.23 - 70.55)^2 \Rightarrow 93.70$$

$$SS_B = 7(173.69)$$

$$= 1215.83$$

Total Variation:

$$SS_T = \sum_j (x_{ij} - \bar{x}_{ground})^2 = 1815.6$$

Test 1

Test 2

Test 3

$(59.44 - 70.55)^2 = 123.43$	$(71.64 - 70.55)^2 = 1.88$	$(75.18 - 70.55)^2 = 21.43$
$(67.34 - 70.55)^2 = 10.30$	$(69.59 - 70.55)^2 = 0.92$	$(80.76 - 70.55)^2 = 104.24$
$(54.99 - 70.55)^2 = 261.14$	$(72.34 - 70.55)^2 = 3.20$	$(79.44 - 70.55)^2 = 75.51$
$(64.75 - 70.55)^2 = 33.64$	$(73.69 - 70.55)^2 = 9.85$	$(93.17 - 70.55)^2 = 511.66$
$(68.64 - 70.55)^2 = 3.64$	$(66.11 - 70.55)^2 = 19.71$	$(74.88 - 70.55)^2 = 18.74$
$(62.29 - 70.55)^2 = 68.92$	$(65.79 - 70.55)^2 = 22.65$	$(76.09 - 70.55)^2 = 30.69$
$(51.58 - 70.55)^2 = 359.86$	$(69.25 - 70.55)^2 = 1.69$	$(82.12 - 70.55)^2 = 133.86$
<u>860.23</u>	<u>59.3</u>	<u>896.13</u>

$$SS_T = 1815.66$$

$$\text{Ground} = 70.55 \quad n = 7$$

mean

$$\bar{x}_1 = 61.64 \quad \bar{x}_2 = 69.77 \quad \bar{x}_3 = 80.23$$

SSB:

k

$$SS_B = \sum_{j=1}^k h_j (\bar{x}_j - \bar{x}_{ground})^2$$

$$\text{Test 1} = 7 \times (61.64 - 70.55)^2 = 555.71$$

$$\text{Test 2} = 7 \times (69.77 - 70.55)^2 = 4.25$$

$$\text{Test 3} = 7 \times (80.23 - 70.55)^2 = 655.91$$

$$SS_B = 1215.87$$

$$\begin{aligned}
 SS_W &= SS_T - SS_B \\
 &= 1815.66 - 1215.87 \\
 &= 599.78
 \end{aligned}$$

$$\begin{aligned}
 k &= 3 \\
 N &= 21
 \end{aligned}$$

$$df_1 = k - 1 = 3 - 1 = 2$$

$$df_2 = n - k = 21 - 3 = 18$$

$$df_T = N - 1 = 20$$

Now equate:

$$MS_B = \frac{1215.87}{2} \left(\frac{SS_B}{df_1} \right) = 607.93$$

$$MS_W = \frac{599.78}{18} \left(\frac{SS_W}{df_2} \right) = 33.32$$

$$F = \frac{MS_B}{MS_W} = \frac{607.93}{33.32} = 18.24$$

$$F_{critical} = 3.55$$

$$F_{actual} = 18.24$$

$$18.24 > 3.55$$

so, H_0 will be rejected.