Independent Sample T-Test (Equal Variance)

Control (x)	Drug (y)	$(x-\bar{x})^2$	$(y-\bar{y})^2$
23	16	20.25	5.44
15	21	12.25	7.11
16	16	6.25	5.44
25	11	42.25	53.78
20	24	2.25	32.11
17	21	2.25	7.11
18	18	0.25	0.11
14	15	20.25	11.11
12	19	42.25	0.44
19	22	0.25	13.44
21	13	6.25	23.44
22	24	12.25	32.11
$n =$ 12	12	$\Sigma = 167$	$\Sigma = 196.67$

$\bar{x} = 18.50$ $\quad$ $\bar{y} = 18.33$

$$S_x^2 = \frac{\Sigma(x-\bar{x})^2}{n-1} = \frac{167}{11} = 15.18$$

$$S_y^2 = \frac{\Sigma(y-\bar{y})^2}{n-1} = \frac{196.67}{11} = 17.88$$

$$F_{stat} = \frac{\text{High } s^2}{\text{Low } s^2} = \frac{17.88}{15.18} = 1.178$$

$F_{crit} = 2.82$

$F_{stat} < F_{crit}$ $\therefore$ Equal variance

$n_1 = 12$

$n_2 = 12$

$\bar{x} = 18.50$

$\bar{y} = 18.33$

$S_x^2 = 15.18$

$S_y^2 = 17.88$

$$t = \frac{(\bar{x} - \bar{y})}{\sqrt{\left(\frac{Sp^2}{n_1}\right) + \left(\frac{Sp^2}{n_2}\right)}}$$

$$Sp^2 = \frac{(n_1 - 1) S_x^2 + (n_2 - 1) S_y^2}{n_1 + n_2 - 2}$$

$$= \frac{11 \times 15.18 + 11 \times 17.88}{12 + 12 - 2}$$

$$Sp^2 = 16.53$$

$$t = \frac{(18.50 - 18.33)}{\sqrt{\left(\frac{16.53}{12}\right) + \left(\frac{16.53}{12}\right)}}$$

$$= \frac{0.17}{\sqrt{1.3775 + 1.3775}}$$

$$= \frac{0.17}{\sqrt{2.755}}$$

$$t_{stat} = \frac{0.17}{1.66} = 0.102$$

$$\boxed{DoF = 22}$$

$$t_{crit} = 2.074$$

$$t_{stat} < t_{crit}$$

$$\boxed{\therefore \text{ fail to reject } H_0}$$