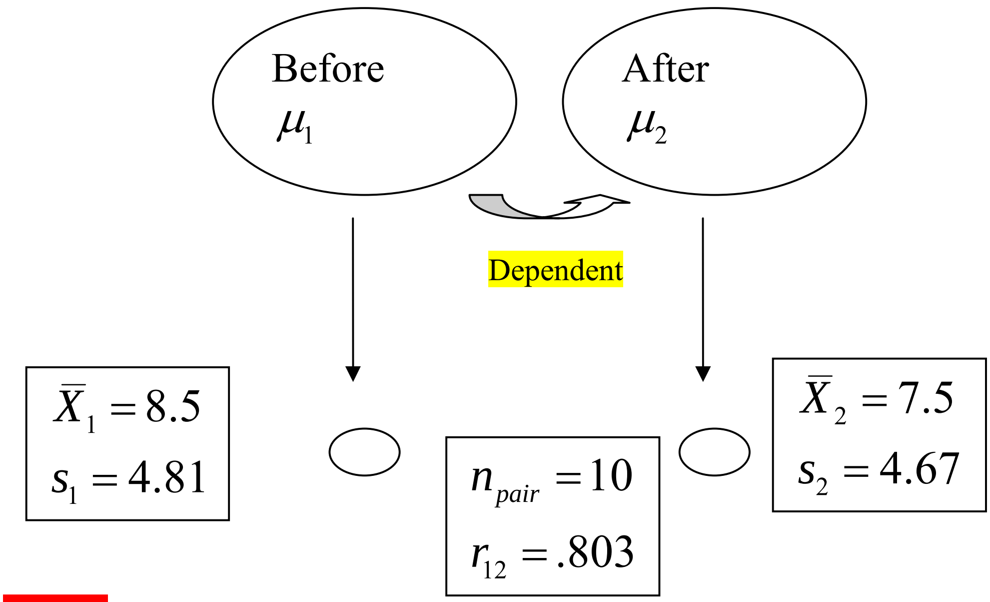
Dependent t Test
Dr. Noname's Problem



Step 1

$$H_0 : \mu_1 - \mu_2 = 0$$
$$H_1 : \mu_1 - \mu_2 \neq 0$$
$$\alpha = .05$$

Step 2

$$\bar{X}_1 - \bar{X}_2 = 8.5 - 7.5 = 1.00$$

$$s_1 = \sqrt{\frac{\sum(X_1 - \bar{X})^2}{n_1 - 1}} = \sqrt{\frac{SS_1}{n_1 - 1}} = 4.81, s_2 = 4.67$$

$$n_{pair} = 10$$

$$s_{\bar{X}_1 - \bar{X}_2} = \sqrt{\frac{s_1^2 + s_2^2 - 2 \cdot r_{12} \cdot s_1 \cdot s_2}{n}} = .9424$$

$$t_{calc} = \frac{(\bar{X}_1 - \bar{X}_2) - 0}{s_{\bar{X}_1 - \bar{X}_2}} = \frac{1.00}{.9424} = 1.06$$

Step 3

1. Critical Value (CV) Approach

$$t_{crit} = t_{\alpha,df} = t_{\alpha,n_{pair}-1} = t_{.05,9} = 2.26$$

$$t_{calc} < t_{crit}$$

Fail to reject H_0

2. The p value Approach

$$p = .316$$

$$p > \alpha$$

Fail to reject H_0

Step 4

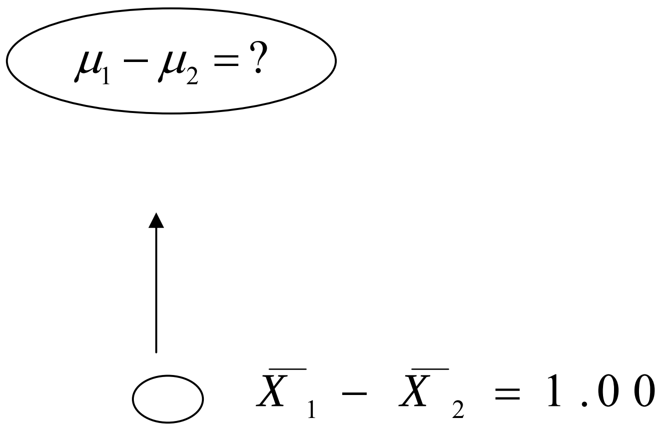
Fail to reject H_0

There is no significant difference between the mean before the treatment and the mean after the treatment ($t_9 = 1.06, p = .316$).

Or

The herbal treatment did not make a significant difference in the out-of-seat behavior ($t_9 = 1.06, p = .316$).

Interval Estimation



Point Estimate ± (Critical Value at α)(SE)

$$(\bar{X}_1 - \bar{X}_2) \pm t_{\alpha,df} \cdot s_{\bar{X}_1 - \bar{X}_2}$$

A 95% (α = .05) Confidence Interval

$$1.00 \pm (2.26) \cdot (.9429) = 1.00 \pm 2.13$$

$$-1.13 < \mu_1 - \mu_2 < 3.13$$

A 99% (α = .01) Confidence Interval

$$1.00 \pm (3.250) \cdot (.9424) = 1.00 \pm 3.06$$

$$-2.06 < \mu_1 - \mu_2 < 4.06$$