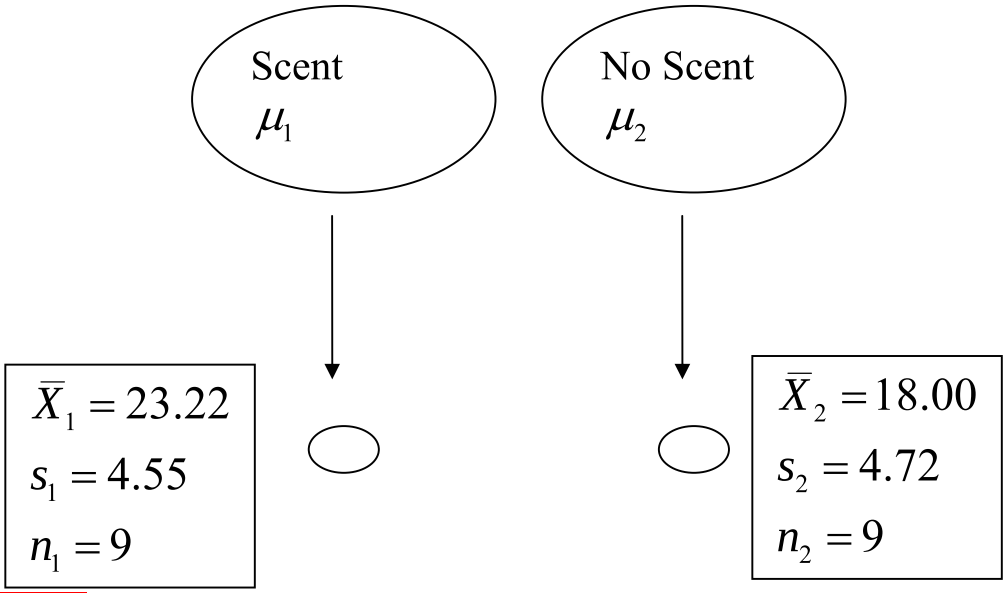
Independent t Test
Gregory's Problem



Step 1

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

Step 2

$$\bar{X}_1 - \bar{X}_2 = 23.22 - 18.00 = 5.22$$

$$s_1 = \sqrt{\frac{\sum(X_1 - \bar{X})^2}{n_1 - 1}} = \sqrt{\frac{SS_1}{n_1 - 1}} = 4.55, s_2 = 4.72$$

$$n_1 = 9, n_2 = 9,$$

$$s_{\bar{X}_1 - \bar{X}_2} = \sqrt{\frac{SS_1 + SS_2}{n_1 + n_2 - 1} \cdot \left(\frac{1}{n_1} + \frac{1}{n_2}\right)} = 2.18$$

$$t_{calc} = \frac{(\bar{X}_1 - \bar{X}_2) - 0}{s_{\bar{X}_1 - \bar{X}_2}} = \frac{5.22}{2.18} = 2.39$$

Step 3

1. Critical Value (CV) Approach

$$t_{crit} = t_{\alpha,df} = t_{\alpha,n_1+n_2-2} = t_{.05,16} = 2.12$$

$$t_{calc} \geq t_{crit}$$

Reject H_0

2. The p value Approach

$$p = .029$$

$$p \leq \alpha$$

Reject H_0

Step 4

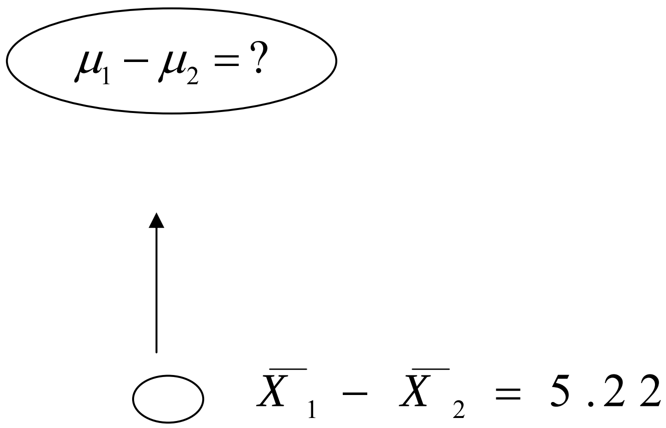
Reject H_0

There is a significant difference between the means of the two groups ($t_{16} = 2.39, p = .029$).

Or

The mean recall score for the scent group was significantly higher than that for the no-scent group ($t_{16} = 2.39, p = .029$).

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

$$5.22 \pm (2.12) \cdot (2.18) = 5.22 \pm 4.62$$

$$.60 < \mu_1 - \mu_2 < 9.84$$

A 99% (α = .01) Confidence Interval

$$5.22 \pm (2.921) \cdot (2.18) = 5.22 \pm 6.37$$

$$-1.15 < \mu_1 - \mu_2 < 11.59$$