

## FORMULAS USED

## 1. Mean

$$M = \frac{\sum X}{N} \quad \text{Garrett (1967), P.27}$$

## 2. (A) Co-efficient of Correlation (r)

$$r = \frac{N\sum XY - \sum X \cdot \sum Y}{\sqrt{(N\sum X^2 - (\sum X)^2) (N\sum Y^2 - (\sum Y)^2)}}$$

r = Coefficient of correlations.

N = Number of the pairs.

$\sum XY$  = Sum of the product of two variable.

$\sum X$  = Sum of first variable.

$\sum Y$  = Sum of second variable.

$\sum X^2$  = Sum of squares of first variable

$\sum Y^2$  = Sum of squares of second variable

Garrett (1967), P.143.

## (B) Rank Difference Correlation

$$r_s = 1 - \frac{6\sum D^2}{N(N^2-1)}$$

$r_s$  = Coefficient of correlation from rank difference.

$\sum D^2$  = Sum of squares of difference in rank.

N = Number of the pairs.

Garrett (1967), P.372.

## 3. Difference of Means

(i) Independent Means

(ii) Correlated Means

(A) The SE of the difference between two independent means for big sample (say more than 30).

$$\sigma_D = \sigma_{m_1 - m_2} = \sqrt{\sigma_{m_1}^2 + \sigma_{m_2}^2}$$

$$\sigma_D = \text{SE} = \sqrt{\frac{\sigma_1^2}{N_1} + \frac{\sigma_2^2}{N_2}}$$

$\sigma_D$  = Standard error.

$\sigma_1$  &  $\sigma_2$  = SDs of two samples.

$N_1$  &  $N_2$  = Size of the sample

Garrett (1967), P.214

(B) The SE of the difference between two means for small sample (say less than 30).

$$\text{SE}_D = \text{SD} \sqrt{\frac{N_1 + N_2}{N_1 N_2}}$$

Where,

$$\text{SD} = \sqrt{\frac{\sum (X_1 - M_1)^2 + \sum (X_2 - M_2)^2}{N_1 + N_2 - 2}}$$

$\sum (X_1 - M_1)^2$  = Sum of the squares of the deviation from the mean for first sample.

$\sum (X_2 - M_2)^2$  = Sum of the squares of the deviations from the mean for second sample.

$M_1$  &  $M_2$  = Size of the samples.

Garrett (1967), P.224

(C) The standard error (SE) of the difference between two correlated means.

$$SE_D = \sqrt{\sigma_{m_1}^2 + \sigma_{m_2}^2 - 2 r_{12} \sigma_{m_1} \sigma_{m_2}}$$

$\sigma_{m_1}$  &  $\sigma_{m_2}$  are the standard errors of the two samples.

$r_{12}$  correlation between two samples.

Garrett(1967),P.226.

(D)  $t = \frac{D}{SE}$  (for small sample)

D = Difference of two means.

SE= Standard error

CR=  $\frac{D}{SE}$  (for big sample)