Partial and Semi Partial Correlation Assignment-2021102016

Partial Correlation Formula

The formula for partial correlation is:

$$r_{12.3} = \frac{r_{12} - r_{13}r_{23}}{\sqrt{(1 - r_{13}^2)(1 - r_{23}^2)}}$$

Given Values

- $r_{12} = 0.75$ (Correlation between GPA and IQ)
- $r_{13} = 0.56$ (Correlation between GPA and Test Score)
- $r_{23} = 0.46$ (Correlation between IQ and Test Score)

Substituting Values for Partial Correlations

$$r_{12.3} = \frac{0.75 - (0.56 \cdot 0.46)}{\sqrt{(1 - 0.56^2)(1 - 0.46^2)}}$$

$$r_{12.3} = 0.669 \quad \text{(GPA and IQ controlling for Test Score)}$$

Similarly:

$$r_{13.2} = \frac{0.56 - (0.75 \cdot 0.46)}{\sqrt{(1 - 0.75^2)(1 - 0.46^2)}}$$

$$r_{13.2} = 0.366 \quad \text{(GPA and Test Score controlling for IQ)}$$

$$r_{23.1} = \frac{0.46 - (0.75 \cdot 0.56)}{\sqrt{(1 - 0.75^2)(1 - 0.56^2)}}$$

$$r_{23.1} = 0.073 \quad \text{(IQ and Test Score controlling for GPA)}$$

Semi-Partial Correlation Formula

The formula for semi-partial correlation $sr_{1.(2,3)}$ is:

$$sr_{1.(2,3)} = \frac{r_{12} - r_{13}r_{23}}{\sqrt{1 - r_{13}^2}}$$

Substituting Values for Semi-Partial Correlation

$$sr_{1.(2,3)} = \frac{0.75 - (0.56 \cdot 0.46)}{\sqrt{1 - 0.56^2}}$$

$$sr_{1.(2,3)} = \frac{0.75 - 0.2576}{\sqrt{1 - 0.3136}}$$

$$sr_{1.(2,3)} = \frac{0.4924}{\sqrt{0.6864}}$$

$$sr_{1.(2,3)} = \frac{0.4924}{0.8284}$$

$sr_{1.(2,3)} = 0.594$ (Correlation between GPA and IQ, controlling for effect of Test Score on GPA)