BASIC TERMS AND CONCEPTS

Types of Scores: **Raw:** X_{1i}, X_{2i} **Mean-deviation:** $x_{1i} = X_{1i} - M_1$ **Standardized:** $z_{1i} = x_{1i} / s_1$

Mean: $M_1 = 1/n \sum X_{1i}$ [means of both x_{1i} and $z_{1i} = 0$]

Variance: $s_1^2 = 1/n \sum x_{1i}^2 = 1/n \sum (X_{1i} - M_1)^2$ [variance of x_1 = variance of X_1, but variance of $z_1 = 1$]

Sums of cross-products: $\sum x_{1i}x_{2i}$

Covariance: $c_{12} = 1/n \sum x_{1i} x_{2i} = 1/n \sum (X_{1i} - M_1) (X_{2i} - M_2)$ [s_{11} = "c_{11}"]

Correlation: $r_{12} = c_{12} / s_1 s_2$ [= the covariance between z scores = the average cross-product of z scores]

Regression equation (bivariate):

$\hat{X}_{1i} = b_{10} + b_{12} X_{2i}$
b_{10} = the intercept for raw-score independent variable,
b_{12} = the unstandardized regression coefficient

$\hat{X}_{1i} = b_{11} + b_{12} x_{2i}$
b_{11} = the intercept for mean-deviation independent variable ("centracept"),
b_{12} = the unstandardized regression coefficient

Error: $e_i = X_{1i} - b_{11} - b_{12}x_{2i}$

Least-squares minimization function: $\sum e_i^2 = \sum (X_{1i} - b_{11} - b_{12}x_{2i})^2$

Least-squares parameter estimates: $b_{11} = M_1$ $b_{12} = c_{12} / s_1 s_2$

Standardized regression equation:

$$\hat{z}_{1i} = r_{12} z_{2i}$$

Partition of total (standardized) variance into unexplained and explained:

$s_1^2 = 1 = s_e^2 + r_{12}^2$

Standard error of estimate:

Standardized scores: $s_e = (1 - r_{12}^2)^{½}$

Raw scores: $s_e = s_1 (1 - r_{12}^2)^{½}$