Estimating Confidence and Uncertainty about Scores

True scores for interpretation of an individual score

Estimate of the True Score:

$$T' = r_{xx}\left(X - \overline{X}\right) + \overline{X}$$

Note: A close estimate can be obtained by using the observed score if items are of moderate difficulty and the student's score is not extreme.

Estimate of Uncertainty:

$$S_e = S_x\sqrt{1 - r_{xx}}$$

$$T' \pm k(S_e)(\sqrt{r_{xx}})$$

Predicting a criterion score

Estimate of the Predicted Score:

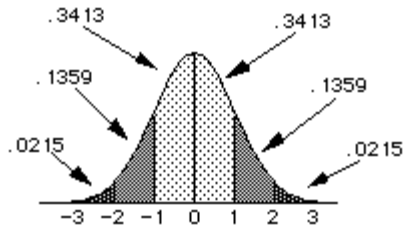
$$\hat{Y} = r_{xy}\frac{S_y}{S_x}\left(X - \overline{X}\right) + \overline{Y}$$

Note: We would generally predict scores from more than just one piece of information.

Estimate of Uncertainty:

$$S_{Y\bullet X} = S_y\sqrt{1 - (r_{xy})^2}$$

$$\hat{Y} \pm k(S_{Y\bullet X})$$



Corresponding Percentages:
± 1: 68.26%
± 2: 95.44%
± 3: 99.74%

Actual z-score values (from a table) correspond to:

68% within ± 1 *SD*
95% within ± 1.96 *SD*
99% within ± 2.58 *SD*

The *SD* could be replaced with S_e (*SEM*) or $S_{Y\cdot X}$ if the distribution is normal.