

Applied Issues in Statistical Banding

Maury Buster, Ph.D.

Alabama State Personnel Department

Purpose

- Without taking a position on statistical banding, address a number of operational issues associated with it.
- Specifically, review such issues as:
 - Standard error of measurement (SEM) v. standard error of difference (SED)
 - Choice of reliability measure
 - Composite reliability
- Describe federal court case where rank-ordered scoring was successfully defended.

SEM v. SED

- A common question among those applying statistical bands is, “Do I use the SEM or the SED, and ‘Why’?”
- The answer is simpler than you might think, but is dependent upon what you want to know.

SEM v. SED

$$SEM = \sigma_X \sqrt{1 - r}$$

$$SED = \sqrt{2} SEM$$

Where:

σ_X = standard deviation of test scores

r = measure of reliability

NOTE: The final SED bandwidth is found by taking the product of the SED and a value from the normal distribution consistent with a predetermined level of confidence (e.g., one-tail $Z_{.05}=1.65$, two-tailed $Z_{.05}=1.96$).

SEM v. SED

An analyst can seek one of two things:

- Interval of likely/possible true scores around a given individual's score (SEM).
- Test of the significance between two individuals' scores (SED).

SEM v. SED

From an I/O textbook:

“Using the principle of the standard error of measurement, a method has been proposed for establishing bands of scores to replace individual scores. Using this approach, all candidate scores within a band are considered “equal” with respect to the attribute being measured if they fall within some specified number of SEMs of each other (usually 2 SEMs). It is assumed that any within band differences are really just differences due to the unreliability of the measure.

