

Adjustment of Reliability For Variance Change

Researchers will sometimes use a test that has been standardized on a large, heterogeneous population of subjects. Such tests typically report rather high internal-consistency reliability estimates (e.g. Cronbach's estimate.) But what is the reliability if one administers the test to a much more homogeneous population? For example, assume a high school counselor administers a "College Aptitude Test" that reports a reliability of 0.95 with a standard deviation of 15 (variance of 225) and a mean of 20.0 for the national norm. What reliability would the counselor expect to obtain for her sample of students that obtain a mean of 22.8 and a standard deviation of 10.2 (variance of 104.04)? This procedure will help provide the estimate. Shown below is the specification form and our sample values entered. When the compute button is clicked, the results shown are obtained.

Variance Change Affect on Reliability

$R = 1 - (s^2 / S^2) \times (1 - r)$ where R is the estimated reliability of a test obtained on a group with variance S² when a reliability of r was obtained for the same test on a group with variance s².

It is assumed the difference in variance is due solely to the difference in true score variance of the two groups. See Theory of Mental Tests by H. Guliksen, 1950.

Reliability (r) of the reference group : 0.955

Variance (s²) of the reference group : 225

Variance (S²) of the new group : 104.04

Estimated reliability (R) of the new group : 0.90268

Reset Cancel **Compute** Return

Figure 1 Reliability Adjustment for Variability Dialog