

**INFORMATION POINT:***Coefficient alpha*

One way of approaching the assessment of factors such as anxiety or hope is to ask a variety of questions that we think address the factor, give each response a score and add them up. When items are used to form a scale in this way they need to have internal consistency, that is, be measuring the same sort of thing. **Coefficient alpha**, also known as Cronbach's alpha ( $\alpha$ ), measures internal consistency.

The calculation of  $\alpha$  is based on the average correlation among pairs of items making up the scale. Cronbach's alpha ( $\alpha$ ) will have a value between 0 and 1. If the items are perfectly correlated then  $\alpha = 1$ ; if the items are completely unrelated then  $\alpha = 0$ . If  $\alpha$  is high, that is near to 1, then this indicates a high degree of internal consistency. A commonly adopted convention is to claim satisfactory internal consistency if  $\alpha$  is greater than 0.7, but a much higher value would be desirable for a scale to be used in clinical practice. High values of  $\alpha$  should not be accepted uncritically. A high value of  $\alpha$  might arise simply because the scale involves many items, indeed increasing the number of items will generally increase  $\alpha$ . Very high values of  $\alpha$  may indicate that some items are unnecessary.

**Test-retest reliability**

Test-retest reliability tries to assess the reproducibility of the responses to a scale: that is, a test of the stability of a measure over a period of time during which the factor being measured is not expected to change. We can investigate this by repeated administration of the scale. If the scale provides nominal or ordinal data, then Cohen's kappa coefficient is often used to measure test-retest reliability. If we are assessing a scale that provides interval/ratio data, then correlation is often used to compare the two assessments. If we have good test-retest reliability we would expect the correlation to be close to 1. The above article reports correlations in the range 0.89–0.91 for the Herth Hope Scale, which appears to suggest good test-retest reliability.

Correlation is considered to be a weak measure of test-retest reliability as discussed by Bland & Altman (1986), who recommend using confidence intervals to assess the size of the difference between the two scores.

**Further reading**

Bland J.M. & Altman D.G. (1997) Statistics notes: Cronbach's alpha. *British Medical Journal* **310**, 170.

Bland J.M. & Altman D.G. (1986) Statistical methods for assessing agreement between two methods of clinical measurement. *Lancet* **i**, 307–310.

NICOLA CRICHTON