A Reliable Change Index (RCI) for the Epworth Sleepiness Scale (ESS).

The Epworth Sleepiness Scale (ESS) has become the standard measure of excessive daytime sleepiness in obstructive sleep apnoea (OSA).\(^1\) Of interest to clinicians is information about how much a patient’s ESS score must change with treatment for this to be considered significant. As such, the clinical question becomes “Has this patient’s ESS score reduced enough to be confident that the change is more than just measurement variability in the ESS?” This concept of ‘reliable change’ can be addressed through calculation of a Reliable Change Index (RCI) for a specific measure, and is a familiar concept in the psychological literature.\(^2,3\) There is a substantial body of literature addressing details of the statistical calculations associated with the RCI (reviewed by Maassen\(^4\)). However, an indicative example of the formula is that \( RCI = S_{\text{diff}} \times (1.96) \), where \( S_{\text{diff}} = \sqrt{2(S_E)}^2 \), and \( S_E = SD \sqrt{1 - r_{xx}} \). SD is the standard deviation derived from the sample, and \( r_{xx} \) is the reliability coefficient.\(^5\)

In a representative clinical sample with probable OSA, ESS total scores returned a sample standard deviation of 5.15 (mean of 11.23), and a Chronbach’s alpha of 0.83. In this case, \( S_E \) is 2.12, and \( S_{\text{diff}} \) is 3. A change in ESS scores that is greater than 1.96 times the \( S_{\text{diff}} \) is unlikely to occur more than 5% of the time (p<.05) due to measurement unreliability only. The RCI for the ESS in this population is therefore 5.89. That is, a decrease in ESS total score of 6 points is required in order to have confidence that the change is a reliable change.

A change in ESS score greater than the RCI does not indicate clinically significant improvement in daytime sleepiness. Determining clinical significance generally requires well-constructed and well-described normative data. This is currently lacking for the ESS. Use of the RCI or similar index of reliable change enables clinicians to more accurately understand a patient’s response to treatment.