However, split-half reliability provides an inconvenient situation: we are effectively gauging the reliability of **half a test**. It is a well-known fact that reliability is increased by more items (observations); we can all agree that a 100-item test is more reliable than a 10 item test comprised of similar quality items. So the split half correlation is blatantly underestimating the reliability of the full-length test.

The Spearman-Brown Formula

To adjust for this, psychometricians use the Spearman-Brown prophecy formula. It takes the split half correlation as input and converts it to an estimate of the equivalent level of reliability for the full-length test. While this might sound complex, the actual formula is quite simple.

$$r_{full} = \frac{2(r_{half})}{1 + r_{half}}$$