

Statistical Validation of the Q12 Instrument

Validation of a psychological instrument considers two fundamental aspects – Validity and Reliability. Validity measures the accuracy of the instrument – that it measures what it sets out to measure. Reliability measures consistency and dependability by examining the degree of random variations in results.

The validity of the Q12 model has been independently confirmed using an advanced (multivariate) statistical technique called Multi-dimensional Scaling (MDS). MDS is the most appropriate ‘mapping’ method for this data as the raw data consists of discrete binary choices. The analyst was supplied only with a raw data sample on which the scores had been summed, from 500 randomly chosen respondents. The analyst was not aware of the model itself prior to the analysis.

Multi-dimensional scaling is a robust technique for this type of data and in this situation is more robust and reliable than Factor Analysis, which is commonly used for this type of validation.

The MDS analysis used the Chi square method to derive distances from the data and then Euclidean distance was used to calculate the fields. The result accounts for 79% of the variance in the data and has a Kruskal stress value of 0.12 (which are both good results).

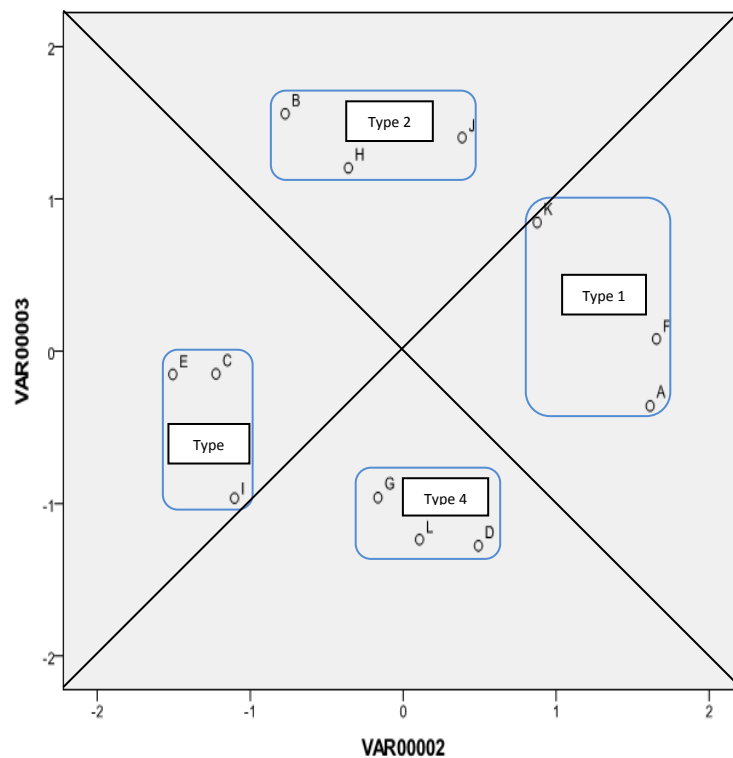


Figure 1 - Multidimensional Scaling

Figure 1 shows a graph of the 12 factor (A-L) Multidimensional Scaling exercise, with groupings into 4 distinct types which were not known to the analyst prior to his calculations. The diagonal lines define 4 quadrants within the Q12 model after consolidation of its 3 dimensions.

Cronbach’s Alpha (a common measure of Reliability) cannot be calculated on the Q12 data set because of the scoring procedures – the total score of each person sums to the same value and thus there is no variance within individuals, and so the statistical procedure cannot be applied.

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