Supporting Information 1

Rasch analysis begins with examining the overall data fit to the Rasch model as well as individual item fit. It also includes the evaluation of residual correlations across items because it possibly influences fit to the Rasch model. Firstly, the overall model fit requires the estimate of item-trait interaction to be not significant, which is reflected by chi square index ($p > .05$). Secondly, the fit residuals for individual items should be in the range between −2.50 and +2.50. Thirdly, the residual correlations between individual items should be examined because values above 0.20 indicate local dependency that can affect both individual items and the overall model fit (1). Finally, there should be no DIF due to relevant individual characteristics (i.e. personal factors) meaning that all items should be invariant across different groups (e.g. age, sex). In addition, PSI is used to evaluate reliability in Rasch analysis, which is not the Rasch model fit criteria but reflects how well the scale discriminates between individuals with different levels of the latent trait (e.g. SCC). PSI is interpreted somewhat similar to Cronbach's alpha with values above 0.70 indicating acceptable reliability for group assessments and 0.80 and higher for individual assessments (2).

Rasch analysis is iterative and continues until the best model fit is achieved. Traditionally, misfitting items are removed to improve the Rasch model fit, which may impact on construct validity of a measure. Instead of deleting misfitting items, super-items can be created by combining locally dependent items together, which has the potential to improve the model fit (2, 3). Generally, the scale meets expectations of the Rasch model if there are no significant interactions between items and the latent trait, no misfitting items, no local dependency and/or DIF, and unidimensionality is evident (4). In this study, deleting items was considered the last resort to optimise the model fit because the IQCODE-16 is a well-validated measure of SCCs that has been shown to predict cognitive function over time (5-7).

In Rasch analysis, principal components analysis (PCA) of the residuals and the equating *t*-test are normally used to evaluate unidimensionality of the scale. Unidimensionality is confirmed when there are less than 5% of significant *t*-test comparisons between person estimates computed for the group of items with the highest and the group of items with the lowest loadings on the first principal component of residuals. Alternatively, the lower bound of the binominal confidence interval computed

for the number of significant *t*-tests should overlap 5% to indicate unidimensionality (8). When the Rasch model fit is satisfactory, the person-item thresholds distribution is examined showing how well items thresholds of the IQCODE-16 cover SCC levels of the sample. Lastly, the transformation table can be produced to convert raw scores into interval level data to increase the precision of assessment. Statistical significance was estimated using the conventional cut-off point of *p*-value >0.05.

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