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What Is A 'Dimension'? Rasch Analysis And Classical Test Theory, And The Role Of Criterion-Related Validity.

Abstract

Rasch Analysis is frequently portrayed as being able to produce interval measures of health-related quality of life. However it suffers many of the problems of Classical test theory, ie. uncertainty about what exactly is being measured.

As noted by Stahl (1990) in discussing the Rasch model,

...various statistical techniques are supposed to detect item dimensionality, but all are based on the questionable assumption that dimensions can be defined or even caused merely by statistical relationships among variables (i.e. linear or correlational relationships). The tautology is that the supposed dimensions are defined by the same techniques used to detect them.

Moreover different techniques are considered most suitable depending upon the data:

When the data are dominated equally by uncorrelated factors, use factor analysis. When they are dominated by highly correlated factors, use Rasch. If one factor dominates, use Rasch" (Richard Smith, 1996, cited by Schumacker and Linacre, 1996).

The principle problem is that statistical procedures do not tell you what the dimension is. Benjamin Wright, the person most responsible and influential in the development of Rasch Analysis in the US, acknowledged that defending any given Rasch-derived scale comes back to construct validity arguments.

*We discover whether our invented dimension, our construct, has any meaning and utility beyond our own imagination by looking for confirmation and contradiction
....Contradictions and deficiencies lead us to re-express our construct and revise our operationalization of it (Wright, 1994).*

This presentation discusses the problems faced by both Rasch and Classical Test Theory when developing or evaluating a HQoL test, and considers a possible way out, a renewed emphasis on Criterion-related validity.

Schumacker RE, Linacre JM. "Factor analysis and Rasch analysis". Rasch Measurement Transactions, 1996, 9:4 p.470

Stahl JA. "Lost in the dimensions" Rasch Measurement Transactions, 1990, 4:4, p.120

Wright BD. "Where do Dimensions Come from?" Rasch Measurement Transactions, 1994, 7:4 p.325

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