

# Validation of order rank scales based on compositional data analysis: A proposal.

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Usually, psychometricians apply classical factorial analysis to evaluate construct validity of order rank scales. Nevertheless, these scales have particular characteristics that must be taken into account: total scores and rank are highly relevant.

Order rank scales can be considered as compositional data in some way, so, taking it into account we propose an alternative to classical procedures based on BIPLLOT of compositional data (GREENACRE & AITCHISON; 2002). To evaluate the covariation structure of variables we propose performing STATIS DUAL (LAVIT, 1988) of appropriate distance for compositional data.

To illustrate our proposal we will apply it to management evaluation data (360-degree feedback). We will present the results of the Leadership Orientations Instrument (BOLMAN & DEAL, 1991) applied to 1.245 Venezuelan managers and to 6.235 evaluations their fellow workers. We will consider external information on the three-mode compositional data matrix in a similar way as Ter BRAAK (1986), does in Canonical Correspondence Analysis.

BOLMAN, L. & DEAL, T. (1991). Leadership and Management Effectiveness: a Multi-Frame, Multi-Sector Analysis. *Human Resource Management*, 30: 509-534.

GREENACRE, M & AITCHISON, J. (2002) Biplot of Compositional Data. *Applied Statistics*, 51(4): 375-392.

LAVIT, C. (1988). *Analyse conjointe de tableaux quantitatifs*. Masson. Paris.

TER BRAAK C.J.F. (1986). Canonical correspondence analysis: a new eigenvector technique for multivariate direct gradient analysis. *Ecology* 67: 1167-1179.