

ORDER & CHAOS ...

MONOTONICITY AND STRESS

Definitions of Types of Monotonicity and Resultant Measures of Fit

1. Definitions of Monotonicity:

STRONG MONOTONICITY (Guttman Rank - Image)

Whenever $\delta_{ij} < \delta_{kl}$ then $d_{ij}^o < d_{kl}^o$

WEAK MONOTONICITY (Kruskal BFMF)

Whenever $\delta_{ij} < \delta_{kl}$ then $d_{ij}^o \leq d_{kl}^o$

2. Stress definitions:

DEFINITIONS OF STRESS

Raw Stress = $\sum_{j,k} (d_{jk} - d_{jk}^o)^2$ (sum of squared residuals from monotone regression)

Normalising Factors :

NF1 = $\sum_{j,k} d_{jk}^2$ (sum of squared distances)

NF2 = $\sum_{j,k} (d_{j,k} - \bar{d})^2$ (sum of squared deviations from mean distance)

STRESS- FORMULAE

$$S_1 = \sqrt{\frac{rawstress}{NF1}}$$

$$S_2 = \sqrt{\frac{rawstress}{NF2}}$$

3. Relations between measures (based on Kruskal BFMF)

$$\mu = \cos(d, d^o) (\text{correlation})$$

$$S_1(Stress) = \sqrt{1 - \mu^2}$$

$$K(Alienation) = S_1$$