

Dissimilarity preservation as a matrix correlation

One can also ask how well the (Euclidean) distances among points in the n MDS plot correlate with the dissimilarities in the resemblance matrix. The former are calculated by running the ordination co-ordinates (output to **Data4** and **Data5** by the ✓Ordinations to worksheet instruction in the above example) through **Analyse>Resemblance>(•Euclidean distance)**. Then, just as for the **Cophenetic correlation** heading in the Section 6 cluster analyses, which was carried out on the same Exe data, a matrix correlation between these two triangular matrices requires a run of the **Analyse>RELATE** routine (Section 14), e.g. with the distance matrix as the active sheet and the dissimilarities **Resem1** as the secondary data (or vice-versa). The only difference this time is that the option to compute a rank correlation such as Spearman should be taken (a *rank Mantel*-type correlation), since this is n MDS and the Shepard plot is not linear. (It is often overlooked that Pearson correlation measures only linearity of a relationship – a stress of zero corresponds to Spearman $\rho_S = 1$ but Pearson $\rho < 1$, when the increasing relationship is perfect but not linear). The permutation test in RELATE is not required since $\rho = 0$ is not a sensible null hypothesis, so set Max permutations: **1** and uncheck the Plot Histogram box, giving $\rho_S = 0.956$ for the 2-d n MDS and 0.965 for the 3-d configuration.

The screenshot displays the PAST software interface. The 'Analyse' menu is open, showing 'RELATE' selected. The 'RELATE' dialog box is open, showing 'Secondary Data' set to 'Resem1' and 'Correlation method' set to 'Spearman rank'. The 'Max permutations' is set to '1', and the 'Plot Histogram' checkbox is unchecked. The 'Sample statistic (Rho)' is 0.956. In the background, the 'Data5' window shows 'Exe 2-d MDS co-ords' and the 'Resem5' window shows 'Exe 2-d MDS distances'.

Variables	1	2
1	1.0746	0.31246
2	1.1623	0.26797
3	1.1602	0.27287
4	1.1497	0.32769
5	-0.92995	-1.0486
6	0.34834	-0.56656
7	0.7311	-0.23202
8	0.82503	-0.19602
9	0.95222	-0.2369
10	-0.78437	-1.0939

Sample	1	2	3	4
1				
2	0.0983			
3	0.0943	0.0053		
4	0.0766	0.0610	0.0558	
5	2.4229	2.472	2.4728	2.4728
6	1.1402	1.1657	1.1678	1.1678
7	0.6437	0.6602	0.6625	0.6625

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