

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 shows the RELATE dialog box in a software interface. The dialog box is titled "RELATE" and "Testing matched resemblance matrices". It shows the "Parameters" section with "Correlation method: Spearman rank" and "Sample statistic (Rho): 0.956". The "Secondary Data" section has "Resemblance/model matrix:" selected, with "Resem1" chosen from the dropdown. The "Max permutations" is set to 1. The "Plot Histogram" checkbox is unchecked. The "Within levels of factor" checkbox is also unchecked, with "site" selected in the dropdown below it. The "OK", "Cancel", and "Help" buttons are at the bottom.

Data5 window shows "Exe 2-d MDS co-ords" and "Other" variables. The table below shows the data for 10 samples across 2 variables.

Samples	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

Resem5 window shows "Exe 2-d MDS distances" and "Distance (0 to inf)". The table below shows the distance matrix for 10 samples.

Samples	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

Revision #4

Created 26 June 2024 22:03:15 by Arden

Updated 22 January 2025 02:30:40 by Abby Miller