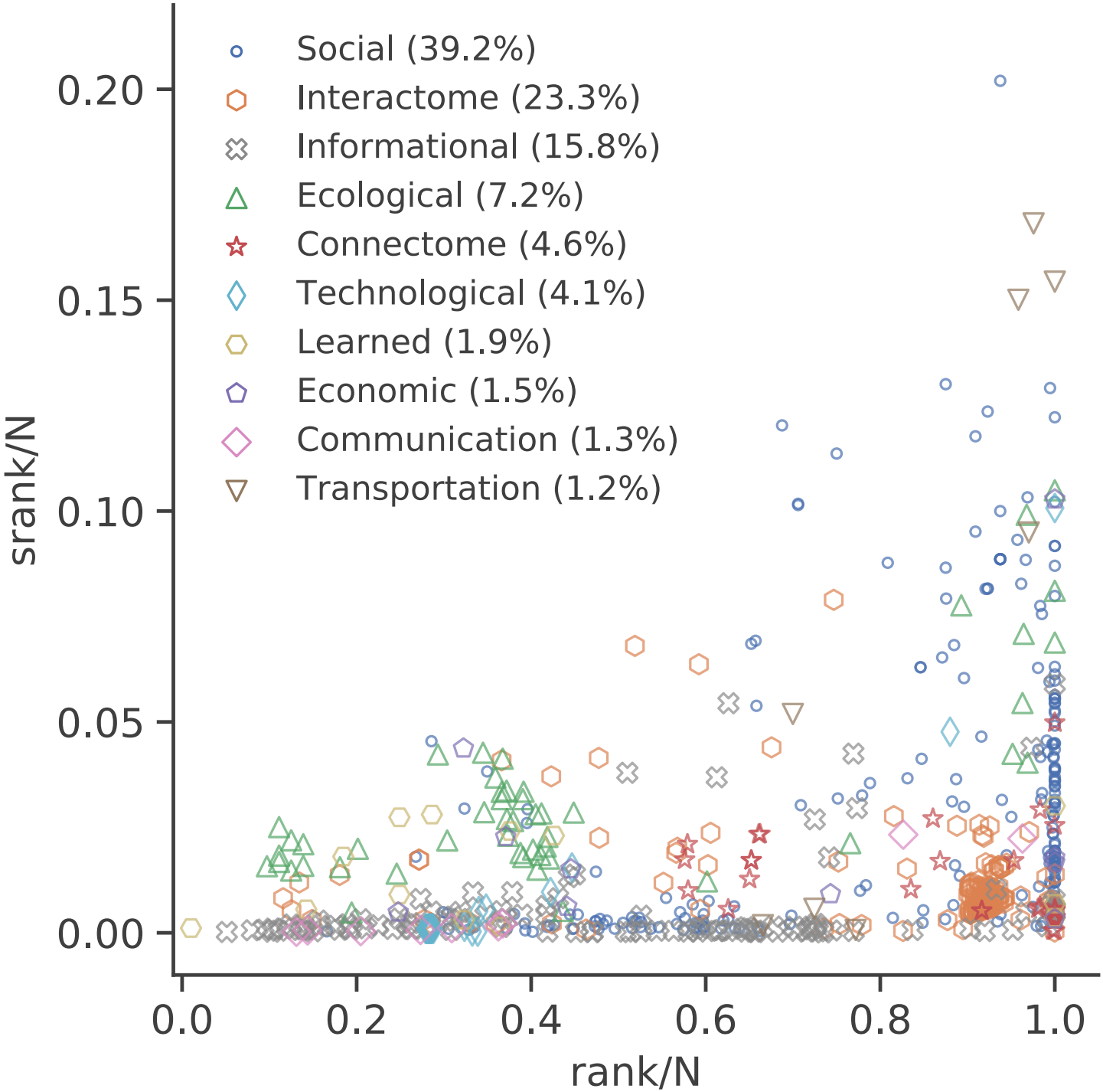
Results for 679 empirical networks (502 unweighted networks and 177 weighted networks) dowloaded from Netzschleuder.

Many empirical networks appear to have a low effective rank!


Social (39.2%)
Interactome (23.3%)
Informational (15.8%)
Ecological (7.2%)
Connectome (4.6%)
Technological (4.1%)
Learned (1.9%)
Economic (1.5%)
Communication (1.3%)
Transportation (1.2%)
srank/N
0.00
0.05
0.10
0.15
0.20
0.0
0.2
0.4
0.6
0.8
1.0
rank/N

The effective ranks of adjacency matrices

But what does “low” mean?

7

The effective ranks of adjacency matrices

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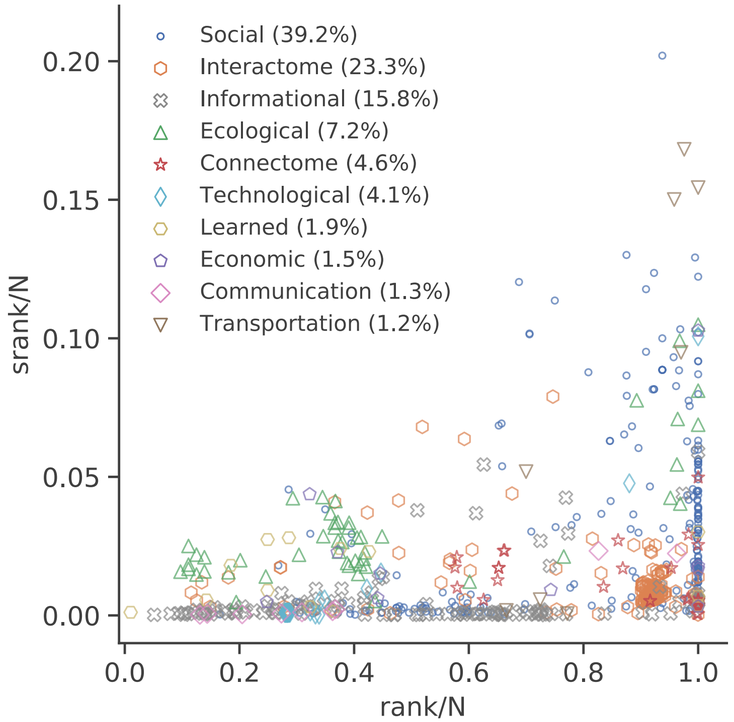

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But what does “low” mean?

A *workable* definition of “low” effective rank

Hint: the rapid decrease of the dominant singular values of the adjacency matrix implies a low effective rank

- low effective rank? $\Rightarrow$ effective rank scales at most sublinearly as the number of nodes, N, goes to infitnity ($N^{1-\varepsilon}$ with $\varepsilon \in (0, 1]$)