Message #3 : connection with structured differential equation models

- mass-action assumes the risk for individuals to become infected is uniformly distributed (i.e. in-degree in the network is distributed according to a Poisson distribution) and is independent of spread
- the final epidemic size can be mapped to a mixture of Poisson in-degree distribution

$$\dot{S}_i(t) = -\beta\sigma_i \sum_j M_{ij} \frac{I_j}{N} S_i \,,$$

$$\dot{I}_i(t) = \beta\sigma_i \sum_j M_{ij} \frac{I_j}{N} S_i - \gamma I_i \,,$$

$$\dot{R}_i(t) = \gamma I_i \,,$$

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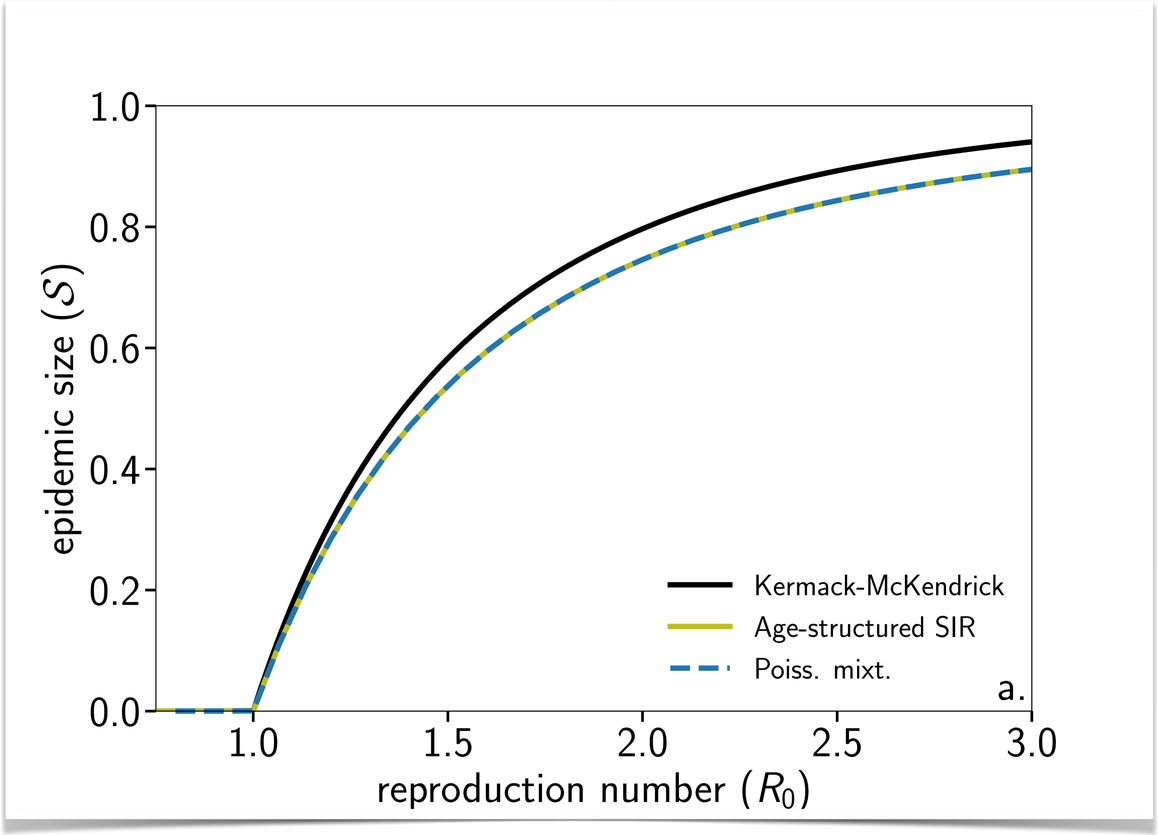

One-sentence conclusion : Embracing networks is an important paradigm shift, but overlooking asymmetric interactions can hide important phenomena.

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