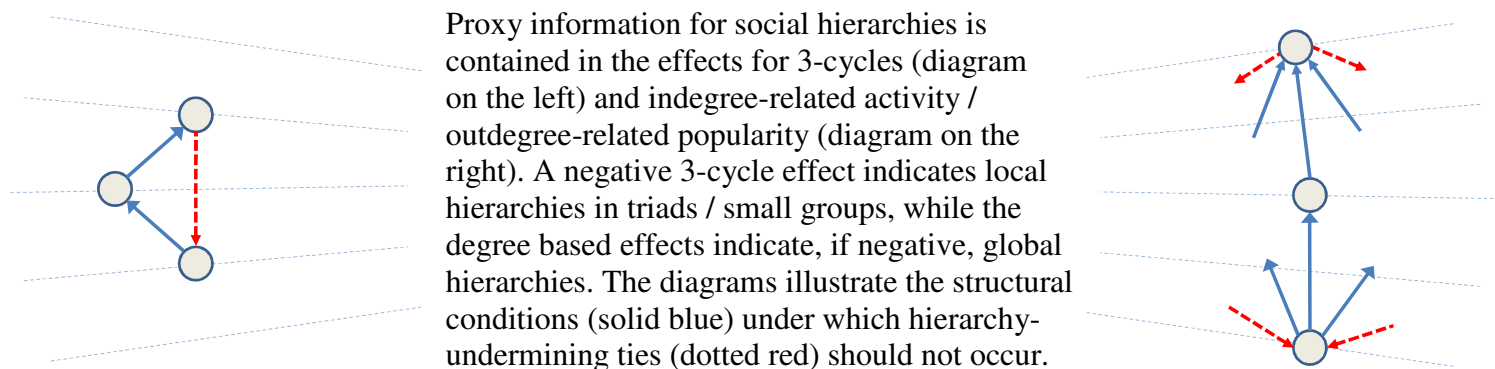## Lab assignment: Studying hierarchy

In this assignment, we want to study how hierarchical structures look like in the boys and girls sub-networks of the *Teenage Health and Lifestyle* data collected at a school in Glasgow (West & Sweeting, 1996).

In stochastic actor-based modelling, for calculation efficiency reasons, endogenous network effects should be expressed by local proxy information.

Proxy information for social hierarchies is contained in the effects for 3-cycles (diagram on the left) and indegree-related activity / outdegree-related popularity (diagram on the right). A negative 3-cycle effect indicates local hierarchies in triads / small groups, while the degree based effects indicate, if negative, global hierarchies. The diagrams illustrate the structural conditions (solid blue) under which hierarchy-undermining ties (dotted red) should not occur.

1. Import the Glasgow school data and generate sub-datasets for the girls and for the boys.

2. Create RSiena sessions for both data sets. Choose the three friendship network measurements as dependent network variable and add the demographic data as actor covariates.

3. Before proceeding, check with the function "print01Report" whether the data were correctly interpreted.

4. Estimate for both groups a model specification that includes outdegree, reciprocity, transitive triplets, transitive ties, 3-cycles, outdegree-popularity, and the sender, receiver and similarity effects of sex. What is the result?

5. Can we say something about differences between boys and girls networks in terms of hierarchical organization?