Final Project task
Social Network Analysis 2025, deadline: 28 March

The purpose of this final project is to go through typical steps of longitudinal social network analysis from data exploration through analysis till drawing conclusions from your results. You are requested to use SAOMs for the final project with at least two waves of data and at least one chosen classroom. You have a limited freedom to choose your own research question and the particular classroom or classrooms from the given larger collection of data files. The data contains full classroom networks from secondary schools in Hungary. A selection of network files, the codebooks, and the original survey questionnaires are available on lisam.

The data is from a 4-wave panel study conducted by the Research Center for Educational and Network Studies (RECENS) at the Centre for Social Sciences, Budapest, led by Károly. The full reference for the data collection is:

Vörös, A., Boda, Z., Néray, B., Pál, J., Kisfalusi, D., Samu, F., Vit, E., Radó, M., Habsz, L., Csaba, Z., Lőrincz, L., Mandácskó, E., Panyik, B., Varga, K., Mezei, G., Makovi, K., Boldvai-Pethes, L., Havelda, A., Bartus, T., & Takács, K. (2022). *Wired into Each Other: Network Dynamics of Adolescents in Hungarian Secondary Schools: 2010-2013*. [data collection]. UK Data Service. SN: 855460, https://doi.org/10.5255/UKDA-SN-855460

The panel is concentrated at the disadvantaged Northern and Central regions of Hungary and therefore overrepresents students of low socio-economic status and of Roma ethnicity. It includes full classroom based networks (students who lacked parental consent are excluded also from the matrixes).

The network files you find on lisam contain only a subset of all network files. If you are interested in further network variables, they are freely available after registration from the UK Data Service. You can also ask these from Károly by e-mail, especially if you want to use them for later work (e.g., for your master thesis). In the zipped file, the multiplex network files are arranged in directories by type (layer). You are advised to use only one or two types (layers) for the final project.

1, Consider the "Trustworthy" network indicating that the respondent (sender) indicated the receiver of being somebody who could be trusted or the "I can ask for help" nominations indicating that the respondent (sender) could turn for help to the receiver as your dependent network. Describe the basic characteristics of this dependent network over multiple waves in **several** classrooms. **Check the amount of change between waves and the stability of the composition of node set.** Based on these descriptives, choose ONE classroom for further investigation. Explain your choice

with arguments.

Hint: In the literature seminar readings concerning SAOMs, you find examples why a classroom or an organization unit is dropped from an analysis (e.g., look at composition change, the Jaccard index, insufficient response, convergence problems).

2. **Formulate at least ONE hypothesis of a triadic character (transitivity or cyclicity). Please justify the hypothesis with arguments from the literature or based on theoretical considerations.**

3. Consider at least one of the other networks (layers) present in the data files. The other networks (layers) contain dislike/hate (check values), good friendship, looking down on somebody, looking up to somebody, being kind, protects the weak, and solves disputes. **Formulate at least ONE cross-network hypothesis about the impact of a presence of another kind of tie on trust or asking for help.**

4. Formulate at least one more cross-network hypothesis that is not purely about the presence of another kind of tie on trust (e.g., mixed reciprocity, mixed transitivity).

The analysis of the co-evolution of two networks or the co-evolution of the network and behavior is only recommended if you have already obtained a convergent model with good GOFs for a model explaining dynamics of a single dependent network.

You are asked to test your hypotheses on ONE classroom, but you are free to use more. You are advised to use few waves only (two is perfectly fine). If you choose less than four waves, explain the choice of selection.

5. **Visualize your dependent network over time in the selected classroom with a meaningful colouring and FIXED spatial positions of the nodes.**

6. **Operationalize your hypotheses for SAOM.**

7. **Conduct RSiena analyses for your hypotheses. If convergence is not reached first, explain what you did next. If convergence is not reached even afterwards, come up with a modified model and explain your choice.** If necessary, change to another classroom. **Continue your**

analysis until convergence is reached. You need to have a converging model at the end.

8. **Check the goodness of fit. Explain what the GoF shows. Update your model at least once to obtain better fit if necessary.**

9. **Interpret your results. Discuss your findings and draw conclusions about your hypotheses. Summarize the limitations of your approach and speculate about how further improvements could be made**.

It is requested that you hand in:
1, a pdf document
2, an ANNOTATED R script / Rmd / Qmd file
3, data file for the chosen classrooms in case you made any modifications (this is not necessary if your R script runs properly on the original data).
WRITE YOUR NAME IN BOTH the R SCRIPT (AT THE TOP) AND IN THE PDF DOCUMENT. The pdf document is recommended to have the following structure:

1. Research questions and theoretical background
2. Hypotheses
3. Data description (descriptive statistics, visualization)
4. Operationalization of hypotheses
5. Results (see literature seminar readings on how SAOM results are presented)
6. Conclusions and discussion

Please send your submission to karoly.takacs@liu.se no later than 28 March, Friday 23:59 CET.