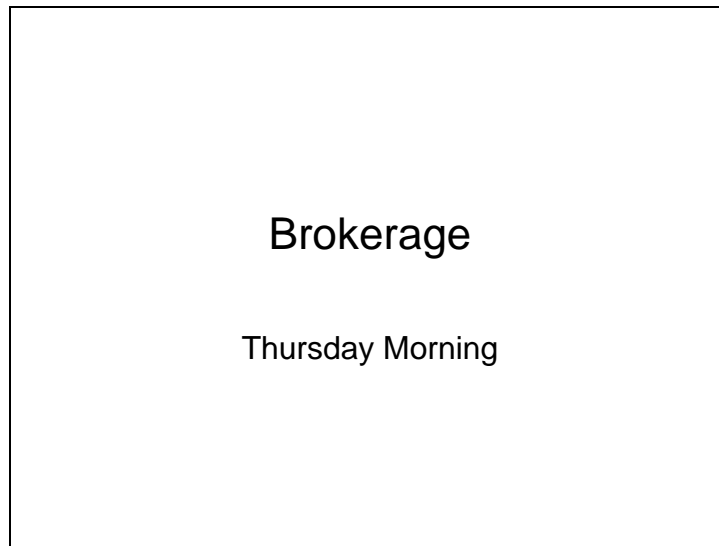


Slide 1



Social Capital, generally speaking, deals with identifying how various network properties can be beneficial, either to the networks themselves or to specific actors in the network. While there is considerable interest in social capital, there are several different and even conflicting views of how social capital works.

Objectives:

After this section, you should be able to:

- Describe the concept of social capital
- Differentiate between the various views of social capital
- Name at least two measures associated with structural holes
- Explain the E-I index and the concept of heterogeneity
- Use UCINET to:
 - Calculate measures of structural holes
 - Calculate transitivity
 - Calculate reciprocity
 - Calculate E-I index
 - Calculate an ego network's strength based on an attribute
- Use NetDraw to:
 - Visualize structural hole measures in NetDraw
 - Visualize reciprocal ties in NetDraw

2009 LINKS Center Summer Workshop

Social Capital & Brokerage Lab

For this lab we will use only one dataset:

KRACK-HIGH-TECH (KHT) & HIGH-TEC-ATTRIBUTES (HTA)

This is a dataset collected by David Krackhardt from managers of a high tech company. KRACK-HIGH-TEC is a stacked dataset containing three directed, dichotomous matrices which represent ADVICE, FRIENDSHIP, and REPORTS_TO ties among 21 managers within the company. HIGH-TEC-ATTRIBUTES contains four attributes for each of the 21 actors, including each manager's age (in years), tenure with company, level in corporate hierarchy, and department.

EXERCISES:

- 1) Structural Holes using UCINET and NetDraw with **KHT** and **HTA**
 - a. If you have not already, unpack (Data | Unpack) the KHT dataset to get the three adjacency matrices **FRIENDSHIP**, **REPORTS_TO**, **ADVICE**.
 - b. Run Network | Ego Networks | Structural Holes on the **FRIENDSHIP** data. From the output, who appears to have the largest Effective Size?
 - c. Load the data in NetDraw to visualize it.
 - d. When you ran structural holes in UCINET it automatically saved the output in a dataset called "StructuralHoles" (unless you changed the name). Load **STRUCTURALHOLES** as an attribute file in NetDraw and use the effective size attribute (EffSize) to size the nodes on the graph. What information does this convey in the graph?
 - e. In NetDraw, run Analysis | Structural Holes. This allows you to do structural hole analysis directly in NetDraw. It also created a new attribute called Density (which refers to the density of each actors Ego-Net). Using the "Nodes" tab in the control region, select this attribute and click on the "size" checkbox to resize the nodes based on Density. What happened? Why? What is the relationship between density and effective size?

- 2) Transitivity and Clustering in UCINET using **KHT**
 - a. Run Network | Cohesion | Clustering Coefficient on the **FRIENDSHIP** data.
 - b. By default, this procedure creates a file called **ClusteringCoefficients**. Open that file in the UCINET spreadsheet (click on the grid icon to bring up the UCINET spreadsheet). Select the data and label from the column labeled "Clus Coef" and copy it. Now, open the **StructuralHoles** dataset created in step 1. Increase the number of columns by 1 by changing then value in the box under "Cols:" in the "Dimensions" section of the window, click in the empty label cell for the new column and paste the data you just copied. Save this dataset with a new name (e.g., **HolesAndClusters**) using File | Save As.

2009 LINKS Center Summer Workshop

- c. Now run Tools | Similarities on this new dataset to find correlations between the variables. Which of Burt's structural holes measures is the most like and the most opposite clustering coefficient?
 - d. Run Network | Cohesion | Transitivity on the **KHT (KRACK-HIGH-TEC)** stacked dataset. What does this tell you? Given that transitivity is about "Closure" (or lack of structural holes), which of the three relations has the most and the least closure?
- 3) E-I Index with UCINET using **KHT & HTA**
- a. Run Network | Cohesion | E-I Index on the **FRIENDSHIP** data, partitioning the data based on department (which is in column 4 of the **HIGH-TEC-ATTRIBUTES** dataset). Looking at the individual E-I index statistics, who has the most homophilous ties (more concentrated within the same department), and who has the most heterophilous (most concentrated outside department) ones?
 - b. Rerun E-I index using the same partitioning, but instead of using the **FRIENDSHIP** dataset, use the stacked **KHT (KRACK-HIGH-TEC)** dataset. What do you think these results tell you?
 - c. Display (using the "D" icon) the **KHT** stacked dataset. Rerun the E-I index on the individual dataset that is displayed first from this command and compare the results to the results from step b. Is this what you thought was happening?
- 4) Brokerage with UCINET using **KHT & HTA**
- a. Run Network | Ego Networks | G&F Brokerage Roles on the same data, again using the department attribute (Column 4 of **HTA**) for your partition vector.
 - b. Open **KRACK-HIGH-TEC** in NetDraw and, using the "Rels" tab in the control region, display only the **FRIENDSHIP** relation. Compare this visualization with the results from step a. It may help to color or shape the nodes by department. Can you find at least one example of each kind of brokerage for Actor 5? Remember, direction counts in brokerage, so make sure you have the arrows on. It might help to only display the Ego Net for Actor 5 by clicking on the Ego button on the icon bar, clearing (using the Clr button) all the selections, and then selecting just Actor 5.
 - c. Running G&F Brokerage Roles automatically created two datasets, one called **BROKERAGE** which is a two-mode matrix of actors by brokerage roles. Run Tools | 2-Mode Scaling | Correspondence on the **BROKERAGE** dataset. Interpret the picture you get.
 - d. Rerun the G&F Brokerage routine using the **REPORTS_TO** data instead of the **FRIENDSHIP** data, still partitioning based on the department attribute. Thinking about the relationships, what can you tell about the actors based on this output.
 - e. Re-run the G&F Brokerage routine on the **REPORTS_TO** data, but this time use the Level attribute (Column 3) to partition that data. How does this data compare to the previous

2009 LINKS Center Summer Workshop

output? Why is it different?

5) Reciprocal ties with NetDraw using **KHT**

- a. Back in NetDraw, ensure you are displaying the **FRIENDSHIP** relation from **KRACK-HIGH-TEC**.
- b. Select Analysis | Reciprocal Ties and complete the dialog box (the defaults are probably sufficient, but feel free to change them if you would like.) Once you click okay the graph will change. Is there any more information on this graph than there was before you used it? Does it convey information more clearly?
- c. To undo the effects of this command, rerun reciprocal ties, but specify both to have black with a size of one.

6) Ego-Net Strength with UCINET and NetDraw using **KHT**

- a. Run Network | Ego Networks | Egonet Composition | Continuous Alter Attributes variable specifying the **ADVICE** dataset you previously unpacked from **KHT** for the Input Network Dataset. For the Input Attribute dataset, specify **HIGH-TEC-ATTRIBUTES** and select the column labeled "Tenure."
- b. This procedure gives information about each actor's egonet with respect to their alters' "Tenure". For example, if we say that getting advice from people who have worked for the company longer is more likely to lead to success, which people are most likely to succeed based on these results?
- c. Go back to NetDraw, load **KHT** and ensure that the **ADVICE** relation is being displayed.
- d. Now load the dataset just created (by default was called **ADVICE-EgoStrength**) as an Attribute file in NetDraw. Size the nodes based on both the "Sum" and the "Avg" (Average) values calculated. How do the results differ? Which do you think is more likely to lead to success?